

SEPTEMBER 1955

# flow

MATERIAL HANDLING

Production • Automation • Packaging • Shipping

## Earl B. Candell

The national president of S.I.P.M.H.E. gives the answer to the question: "What is a Packaging Engineer?" .....page 141

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For Belt Conveyor Scales .....page 78

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Into Automatic Handling  
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Field of  
"Packaging Material  
Handling" .....page 154

10th National S.I.P.M.H.E. Show  
Stresses the Science of  
Packaging .....page 160



of the Industrial Publishing Group

**NOW...**

## **ALL THE SAFETY OF A STAIR**

**and 115 different models  
to meet your exact needs**

Designed for safety, from the sure-grip step tread to the guard rails, Ballymore ladders are available from 1 step to 3 steps without guard rails and from 3 to 12 steps with guard rails.

They provide maximum stability, speed stock-picking, banish fear of falling. All steel, they won't wear out. You have a choice of treads, a choice of widths, with every model an ease of movement that takes the work out of ladder relocation.

### **AUTOMATIC ACTION**

Just step on a Ballymore and it locks to the floor. Yet it rolls easily when no one is on it.



**Safety-Step  
LADDERS**

BALLYMORE COMPANY  
Wayne 5, Pa.

Please send me your complete catalog of  
Ballymore Safety-Step Ladders.

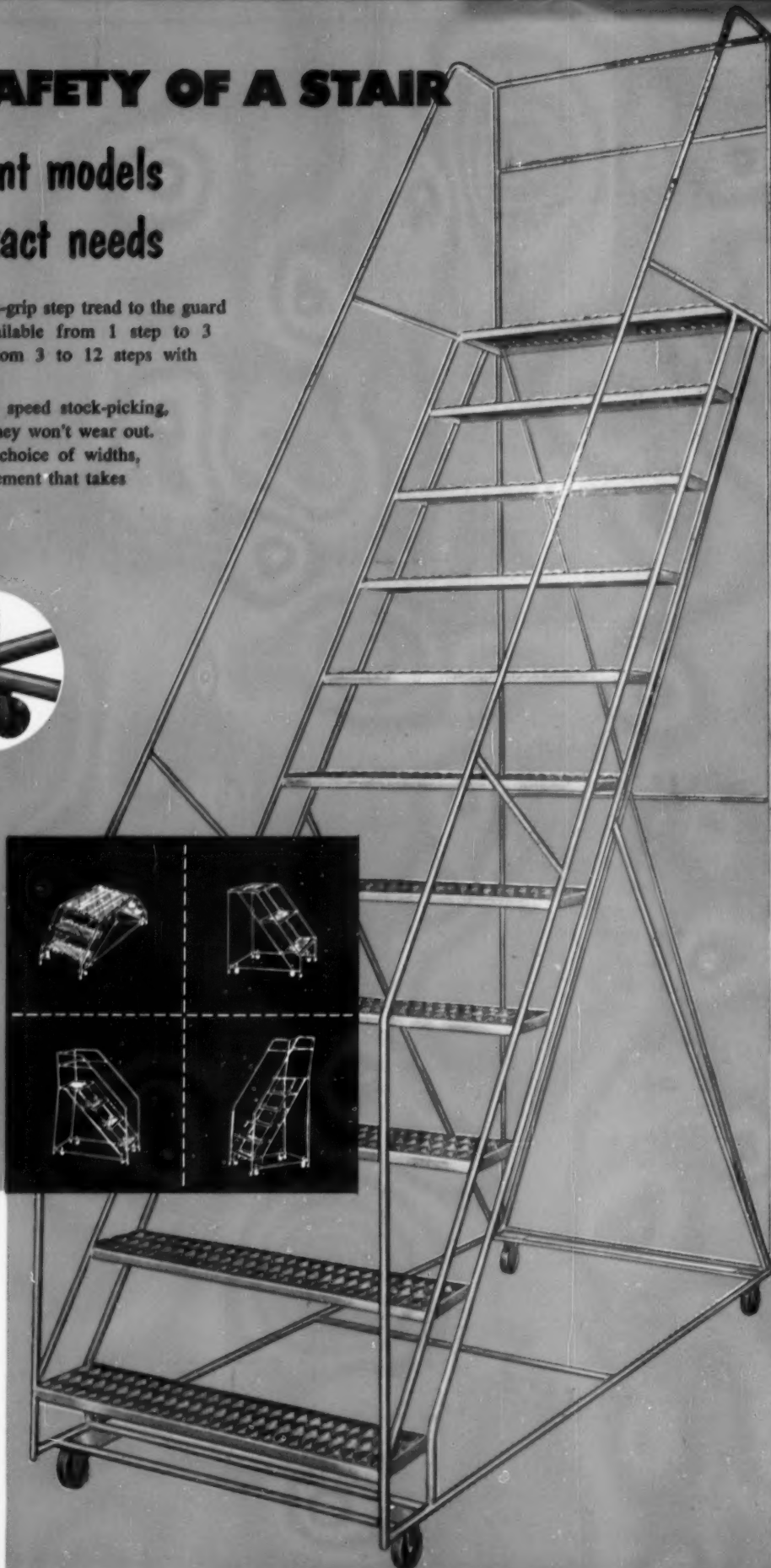
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## You're rolling on solid quality with **Goodyear Industrial Tires**

WHEN IT'S time to order solid Industrial Tires—either for your new trucks or for replacements—get Goodyear—and you get the extra quality that's built into every Goodyear Tire . . .

- ... The quality of the finest name in rubber—and manufacturer of America's most complete line of Industrial Tires
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- ... The quality of five different tread designs—tops for every purpose

For more information on Goodyear quality solid Industrial Tires, see your Goodyear dealer or write Goodyear, Industrial Tire Sales, Akron 16, Ohio.

**SMOOTH-SOLID—**  
for factory, warehouse and loading platform

**GROOVE TREAD SOLID—**  
built to take heavy punishment on big trucks

**ALL-WEATHER TREAD—** for ramps, wet surfaces and other extra-traction conditions

**ALL-SERVICE TREAD XTRA CUSHION**  
built with compact lug design for fast, easy rolling with absolute smoothness and stability

**DID YOU KNOW...**  
that the leading truck manufacturers will fill your order with Goodyear Industrial Tires when you specify them?



All-Service, All-Weather, Xtra Cushion—T.M.'s  
The Goodyear Tire & Rubber Company, Akron, Ohio

**USE THE RIGHT TIRE FOR THE JOB — BUY AND SPECIFY**

# GOOD YEAR

## INDUSTRIAL TIRES

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SEPTEMBER, 1955



*Look for this sign;  
there's a Goodyear  
dealer near you.*



when pounds become volts you can make **MAGIC**

As yet the threshold is only crossed, but the accurate indication of weight by a corresponding voltage opens up a vast area of automatic operations. Such voltage data can be fed to integrators, electronic memories, computers or any

device controlling associated operations.

Such research makes it certain that with any Fairbanks-Morse Scale you can be "a-weigh" ahead. Fairbanks, Morse & Co. 600 S. Michigan Ave., Chicago 5, Illinois.



**FAIRBANKS-MORSE**

*a name worth remembering when you want the best*

SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

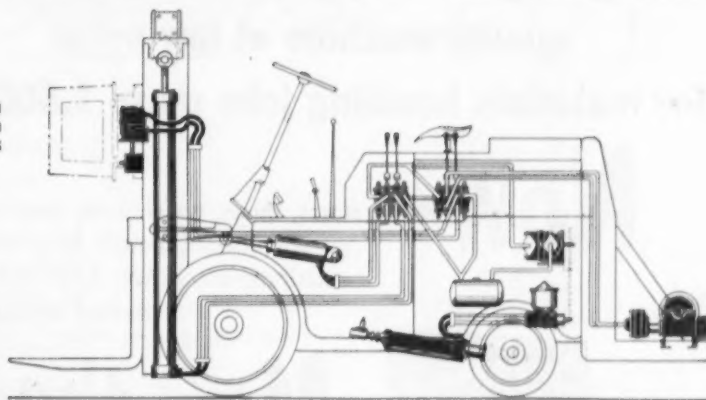
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# VICKERS<sup>®</sup> HYDRAULICS

## The MARK of

### SUPERIOR MATERIALS HANDLING EQUIPMENT

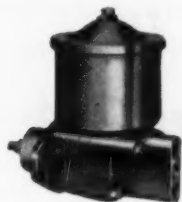
Fork lift truck uses Vickers Hydraulics in one circuit for lift, tilt, roll-over, and winch operation. A separate circuit provides Vickers hydraulic power steering.



**ASK FOR NEW  
BULLETIN M-5101**

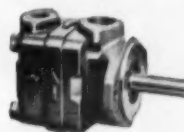
"Vickers Hydraulics" on materials handling equipment denotes superiority in two ways: First, the maker has obtained the benefits of the best in hydraulic equipment. Second, such care in the selection of hydraulic units generally denotes good design and careful construction throughout.

Among the important advantages of Vickers Hydraulics are simplicity of hydraulic design and of installation, complete flexibility of control, inherent protection against abuse and overloading. For further information get in touch with your nearest Vickers Application Engineering office.



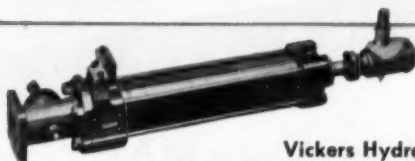
#### Vickers Pump for Hydraulic Power Steering

This pump is vane type, hydraulically balanced, and has automatic wear compensation. Series VT4 has integral volume control and relief valves and oil reservoir.



#### Vickers Pumps (Single and Double)

Balanced vane type pumps that automatically maintain optimum radial and axial running clearances over complete pressure range and throughout pump life. The result is long life and maintained high efficiency.



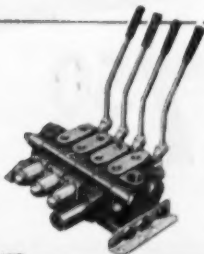
#### Vickers Hydraulic Power Steering Booster

Provides effortless, positive and shockless steering. With the touch of only a finger, driver can steer the heaviest vehicle on or off the road. Fatigue is reduced and driver efficiency increased.



#### Vickers Hydraulic Motors

Balanced vane type with exclusive "rocking beam" construction and automatic wear compensation. Variable horsepower (constant torque) characteristics; reversible and can be stalled under load without damage.



#### Vickers Multiple Unit Valves

Assemblies of standard interchangeable sections provide any desired combination of directional control functions. Exclusive porting arrangement provides smooth and selective inching control and accurate positioning.

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6677

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

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# No More Manual Handling--Anywhere!

## At Last-

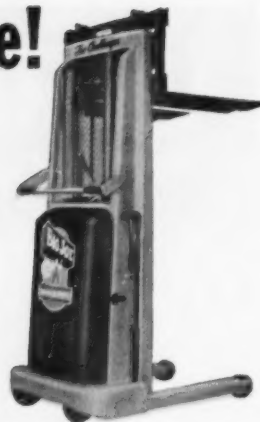
a mass produced

quality machine at low price

for materials handling jobs up to 1,500 lbs.

## Now-

stores, shops, warehouses, post offices, depots, farms, schools, universities, hotels, hospitals, restaurants, service stations, etc. CAN AFFORD one or more battery operated hydraulic lifts.



## More than Ever-

large and small plants alike can economize with fleets of BIG JOE lifts to achieve "hydraulic handling for every department."



COMPARE THE

# Challenger

FOR QUALITY

FOR PERFORMANCE  
FOR PRICE



THE CHALLENGER is another "In-Between-Handling" Tool originated and developed by BIG JOE. Every BIG JOE lift is *guaranteed for quality.*

# \$387<sup>50</sup>

**BIG JOE** MANUFACTURING COMPANY •  
900-88 Jackson Boulevard Chicago 7, Illinois

© 1955 Big Joe Mfg. Co.

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FLOW

September, 1955

Vol. 10, No. 12

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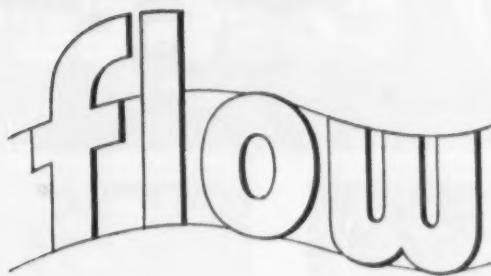
FLOW DIRECTORY  
FLOW'S MATERIAL HANDLING  
ILLUSTRATED  
PRECISION METAL MOLDING  
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COMMERCIAL REFRIGERATION  
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SEPTEMBER, 1955



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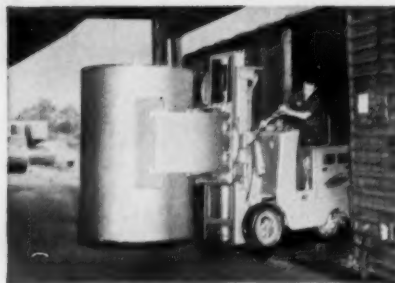
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It will stress the science of packaging.	

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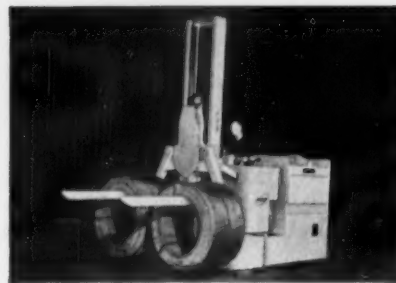
# 20 Cost-Cutting Ideas



**1.** Note the forward tilt and special clamp on this ELPAR truck stabilizes load so it cannot fall from pallet.



**4.** Rotating paper clamp, interchangeable with forks, handles rolls 12" to 51" in diameter and ends paper damage.



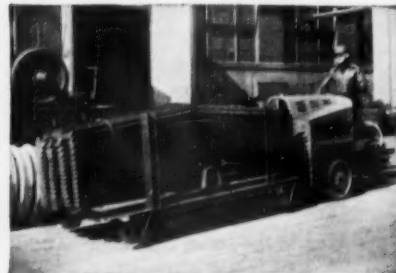
**8.** Hydraulic split ram on this ELPAR steel mill truck can be used as single or double ram or as forks.



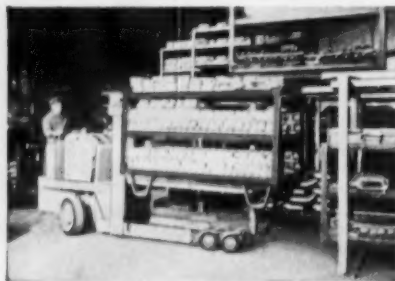
**2.** Electric Powered ELPAR trucks often run for 30% less than comparable gas trucks. No noise or fumes.



**5.** The small ELPAR "Cargo Scout" is designed for truck terminal use. Features high speed and maneuverability.



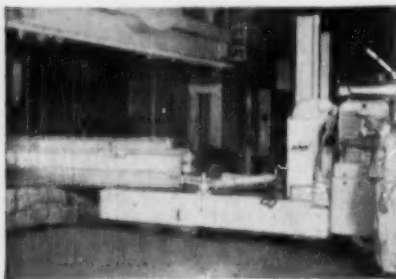
**9.** Only Elwell-Parker builds gas powered low lift platform trucks, often best for long hauls or steep ramps.



**6.** This ELPAR high lift platform truck is specially equipped to handle fragile foundry cores without breakage.



**10.** Use ELPAR Trucks in production. This fork truck quenches castings while moving them from heat treat to storage.



**3.** Latest innovation in handling stamping or forging dies is this ELPAR die bandler. Capacities to 100,000 lbs.



**7.** ELPAR cranes are ideal for bulky, odd shaped loads or hard to reach places. 3,000 to 10,000 lbs. capacity.



**11.** This ELPAR hydraulic pusher attachment saves the manual labor of transferring loads from pallets to box car.



# with **ELPAR** trucks



**12.** ELPAR low lift platform trucks are the most economical for horizontal handling where no tiering is required.



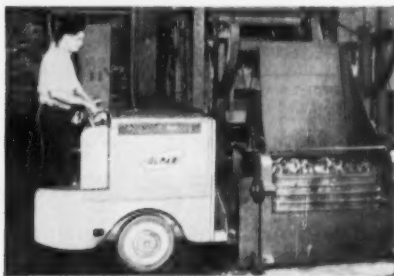
**15.** Forged crankshaft still red hot is safely handled on skid by ELPAR low lift platform truck.



**18.** "King Size" load of bulky truck tires carried on a special skid by ELPAR low lift platform truck.



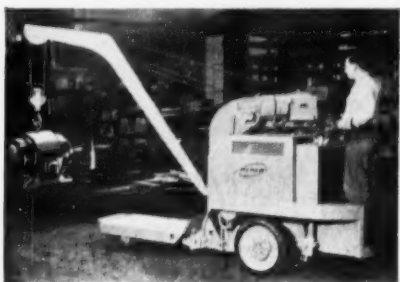
**13.** ELPAR and automation! Here truck with rotating forks dumps forgings into bopper of metal cleaning machine.



**16.** ELPAR engineers designed this truck so that it would dump skids of forgings directly into a Wheelabrator.



**19.** Built in dependability enables ELPAR trucks to work steadily for years amid the water and grease of a tannery.



**14.** Answer to a maintenance man's dream! An ELPAR combination low lift platform truck and crane.



**17.** Handling a load 9' long on a high lift platform truck which costs 40% less than a comparable fork truck.



**20.** This special ELPAR truck solves the breakage problem when carrying 12,000 lbs. of plate glass sheets 145" long.

There's no end to the versatility of Elwell-Parkers. One user said, "We have done everything but eat with them!" From Elwell-Parker's vast reservoir of experience in power trucks, industry is drawing a wealth

of ingenious handling ideas. You can profit, too. Ask for more details on any of these jobs. Your nearby Elwell-Parker field engineer can also help you cut costs with the proper ELPAR truck.

## THE ELWELL-PARKER ELECTRIC COMPANY

4239 St. Clair Avenue • Cleveland 3, Ohio



## FREE TO YOU!



New Condensed Catalog



Fork Truck Attachments Folder



Brochure on Specialty Engineered Trucks

WRITE FOR LITERATURE DESIRED

NEW ELPAR LEASE or TIME PAYMENT PLANS offer advantages for many users. Ask for details.

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# "Stack up" with *American* STORAGE RACKS



AN EXCLUSIVE  
AMERICAN FEATURE



Standard Pallet Racks



Adjustable Pallet Racks



Skid Racks



Tool & Die Racks

## ....Cut your Handling and Warehousing Cost

When you "stack up" with American Tubular Storage Racks, you also "stack up" savings. The ingenious and simplified American feature, "erected without bolting or welding," has made them first choice with many businesses both large and small. American Racks are designed to meet practically every storage need. Send for catalog and get the facts on American before you buy any type of rack.

**send for catalog**



AMERICAN PORTABLE TIERING RACK INSTALLATION  
Automotive Rubber Co., Detroit, Mich.



Drum & Barrel Racks



Coil Racks & Tiering Racks

# AMERICAN METAL PRODUCTS CO.

**STORAGE RACK DIVISION**  
5959 Linsdale • Detroit 4, Michigan

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# flow

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# NEW!

America's first  
**LP-gas** equipped sweeper  
assures efficient  
low-cost sweeping  
**PLUS**

- reduced exhaust fumes
- longer engine life
- lower maintenance costs



## **TENNANT 75** POWER SWEEPER

POWERED BY  
**LP-gas**

Here, in America's *most widely used industrial sweeper*, you can now obtain the many *extra* advantages of LP-gas power.

By eliminating obnoxious exhaust fumes and operating more efficiently, this popular sweeper is ideal for many areas where gasoline-powered units are not desirable—such as confined factory areas, or in bakeries, food plants, tobacco warehouses, etc.

**Sweeps CLEAN;** does work of a crew. Can sweep over 100,000 sq. ft. per hour in open areas. Covers 48" path (with side brush). Has exceptionally powerful brush-and-vacuum system. Easy to operate . . . drives like a car.

**Reduces exhaust fumes** to a fraction of usual amount. Eliminates objectionable odors and helps keep air clean. Greatly reduces carbon monoxide fumes; improves working conditions. Helps prevent contamination of food products, etc.

**Prolongs engine life** by near-perfect combustion of LP-gas. Prevents crankcase dilution; helps make oil last 3 to 5 times longer. Quickly removable 20-lb. pressurized tank allows full 12 hours operation.

**Reduces maintenance costs.** High octane "LP" can cost less per mile than gasoline; leaves no carbon residue. Reduces engine wear, minimizes plug cleaning, engine adjustments, etc. Assures smooth performance.

Write for details from **G. H. TENNANT COMPANY**  
2576 N. 2 St., Minneapolis 11, Minn.



## POWER SWEEPERS

**SPECIALISTS IN INDUSTRIAL FLOOR MAINTENANCE**

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SEPTEMBER, 1955



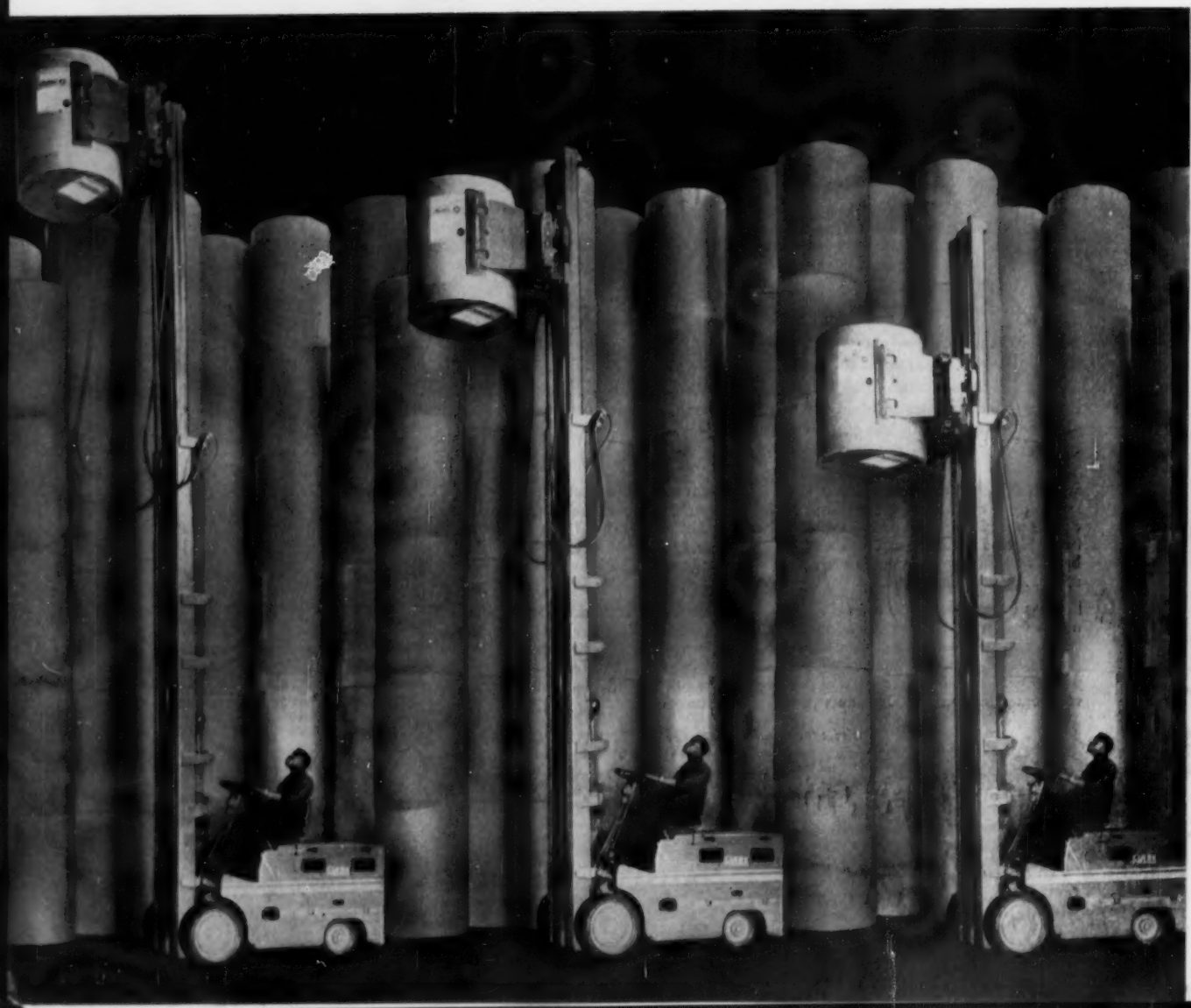
**TENNANT MODEL 24** Sweeper in use at Julia St. Wharf of United Fruit Co. in New Orleans. Sweeper is only 29" wide. Gasoline powered.



**TENNANT ELECTRIC** Sweeper at famed Smith, Kline & French Laboratories (Phila.). Note special dual side brushes. Battery powered.



UP UP UP



32 FEET HIGH! Here at the giant W. F. Hall printing plant in Chicago, a 7,000 lb. Clark truck with a phenomenal 28'6" upright, stacks rolls to the rafters. Hall's main objective: to fully utilize present storage facilities, to facilitate stock segregation, to speed up handling, to handle stock with an absolute minimum of damage.

IT'S A BIG JOB. Each day an average of 15 carloads of stock moves into storage . . . 300 rolls move into the pressrooms. Roll sizes run from 32 to 40 inches diameter, are 22 to 77½ inches deep, weigh as much as 3500 lbs. The Clark truck handles the job easily, at lower cost, in less time. Another example of how Clark equipment meets special handling problems.

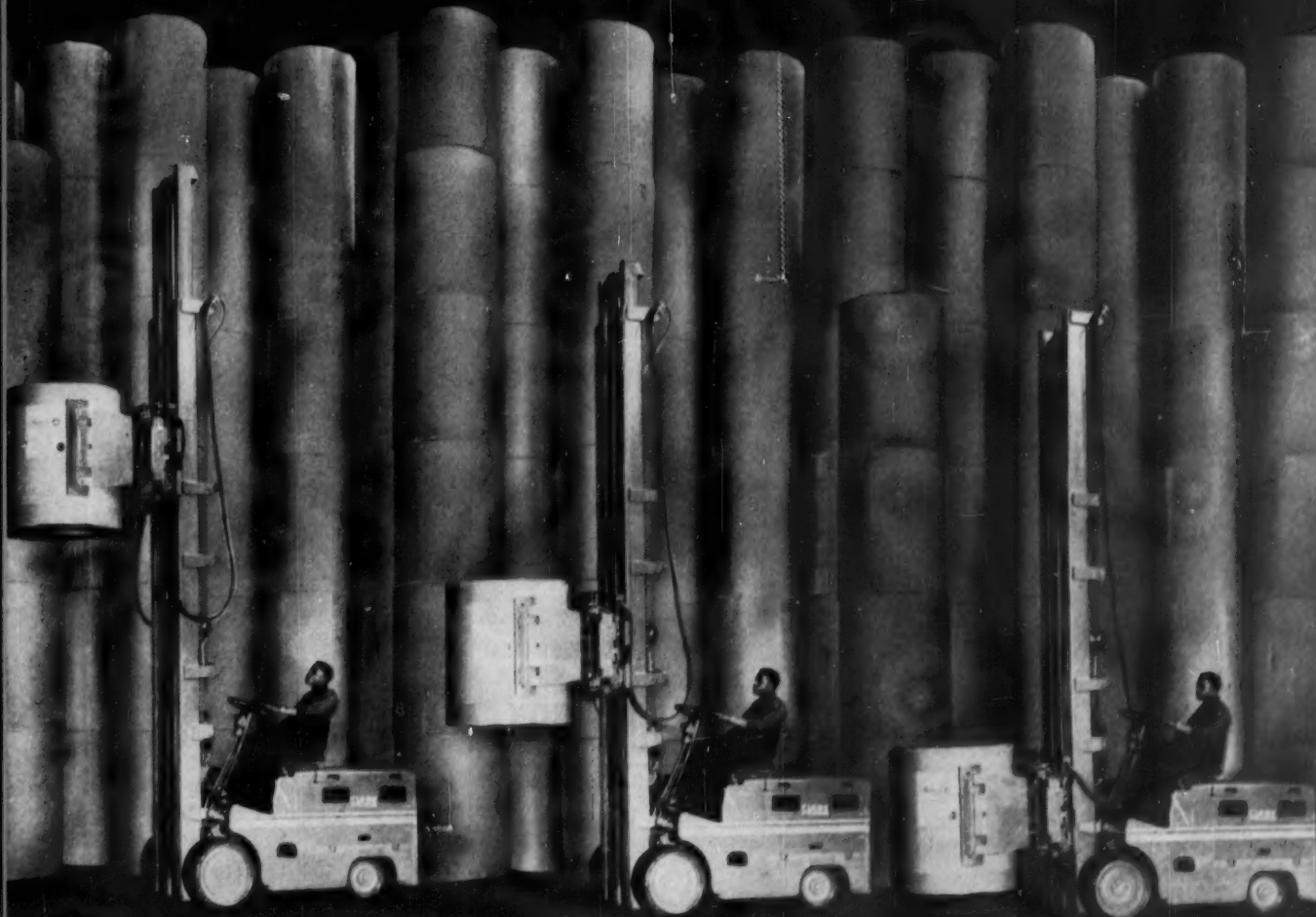
HOW ABOUT YOU? Looking for a solution that's going to cut costs, increase efficiency? Your local Clark dealer is ready to help you at any time. Give him a call today . . . he's listed in the Yellow Pages under "Trucks, Industrial".



Industrial Truck Division  
**CLARK EQUIPMENT COMPANY**  
Battle Creek 13, Michigan

A BETTER BUY WITH LOCAL SUPPLY — *Genuine Clark Parts*

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# Farquhar

power-belt and gravity

## CONVEYOR SYSTEM

handles 40,000 packages per week

at the

**PIGGY-WIGGLY MIDWEST COMPANY**

Rockford, Illinois



To give more complete view of conveyors, photo taken prior to actual operations.

YES, 40,000 PACKAGES PER WEEK move smoothly and swiftly over the *Farquhar* Conveyor System installed recently in the Piggy-Wiggly Midwest Company's three-story warehouse at Rockford, Ill.

Merchandise is unloaded from the railroad siding and trucks and reloaded from all three floors at one common point with a maximum load. The system is engineered and installed to load and unload simultaneously.

Results include... 50% increased handling capacity ... decreased work week from 55 to 45 hours ... and the elimination of two other warehouses.

### FREE

Write for Bulletin Nos. 400 & 401 covering Farquhar Power-Belt and Gravity Conveyors today!

This is another example of Farquhar's ability to engineer and install Bulk or Package Handling Conveyor Systems for your specific materials handling problem. Write us today.

OLIVER

*Farquhar*  
CONVEYORS

### A. B. FARQUHAR DIVISION

THE OLIVER CORPORATION

Conveyor Dept. 5-06  
York, Pa.

618 W. Elm St.  
Chicago 10, Ill.

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## LETTERS to the editors

### AMHS Prexy Pleased

To FLOW:

Since the Chicago show, I have been tied up pretty well with the National meeting of the AMHS in Cleveland and the Lake Placid Material Handling Training Conference.

As this is the first chance I have had to write you, I want to extend my congratulations for the wonderful May issue of FLOW.

Also accept our thanks for sending on a copy to the Honorable Peter W. Rodino, Jr. and the members of the House Judiciary Committee in support of our effort to have established a "National Better Material Handling and Packaging Week".

You may be sure that this issue of FLOW will be read and re-read many times. It is certainly one of the finest issues of any magazine I have ever read.

Congratulations again on a marvelous job.

J. Wellington Hall, President  
American Material Handling Society, Inc.  
Toledo, Ohio

### Gets Ideas

From Flow

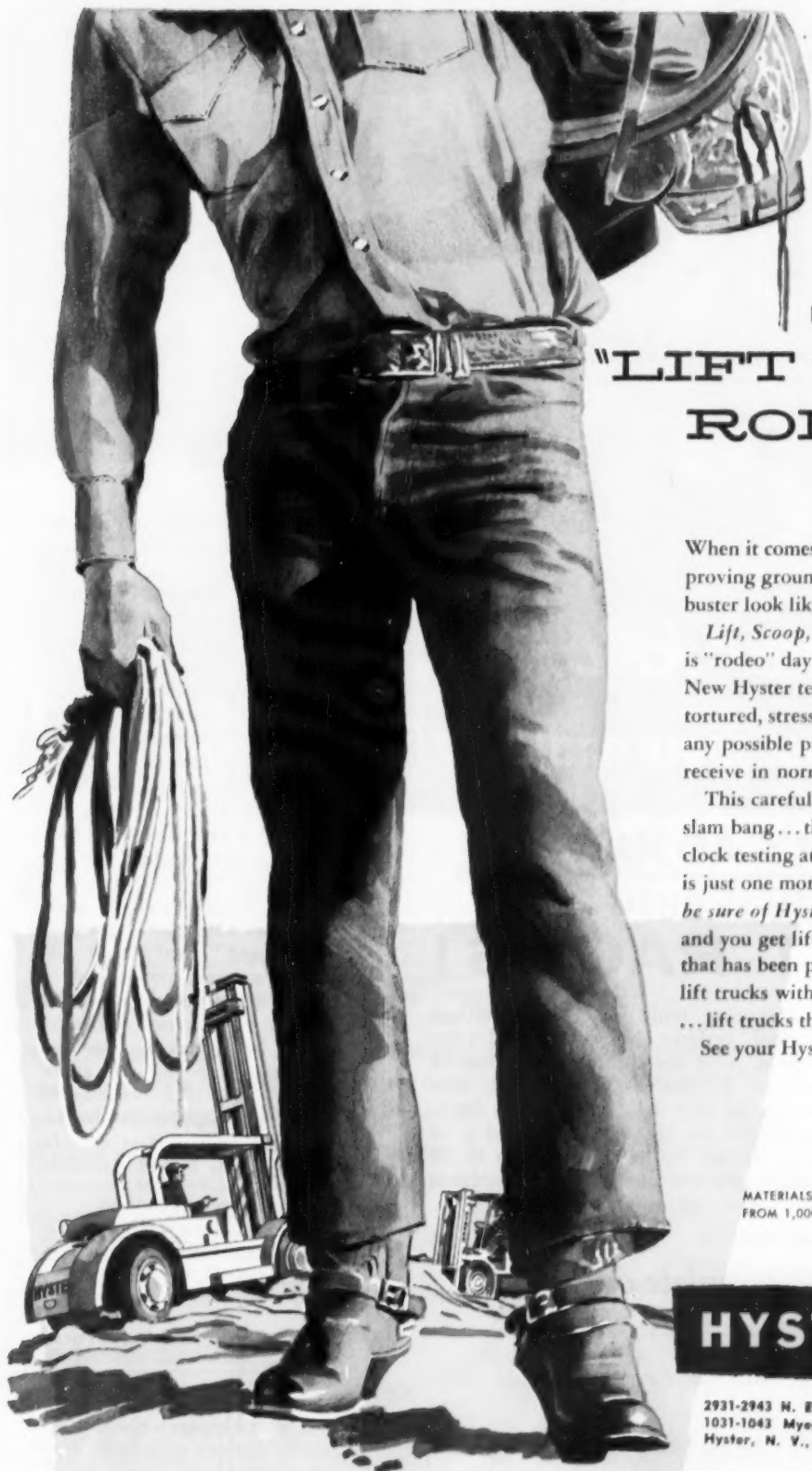
To FLOW:

This department of company headquarters, whose function it is to select, develop and specify material handling equipment, has selected many items based upon your advertising for use at our thirty Distributing Houses located throughout the country and servicing all telephone operating companies of the Bell System. In addition, your feature articles often give us ideas applicable to our warehousing.

We would therefore appreciate being on your mailing list to re-

FLOW





EVER WATCH A  
"LIFT TRUCK  
RODEO"?

When it comes to testing lift trucks, a Hyster proving ground "cowboy" makes a bronco buster look like a tenderfoot.

*Lift, Scoop, Ram, Boom, Grab*—every day is "rodeo" day at the Hyster Proving Ground. New Hyster test trucks are twisted and tortured, stressed and strained—way beyond any possible punishment they would ever receive in normal usage.

This carefully calculated, systematic, slam bang... this always secret, around-the-clock testing at the Hyster Proving Ground is just one more reason why *you can always be sure of Hyster Hy-Quality*. Specify Hyster and you get lift trucks with performance that has been pre-tested and test-proved... lift trucks with no time for downtime... lift trucks that last and last and last.

See your Hyster Dealer, or write for details.

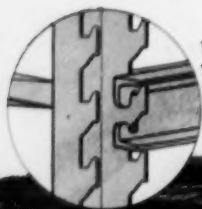
MATERIALS HANDLING TRUCKS  
FROM 1,000 to 30,000 LB. CAPACITY



**HYSTER** COMPANY

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1031-1043 Myers Street, Danville, Illinois  
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FOUR FACTORIES: Portland, Oregon; Danville, Illinois;  
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THE RACK WITH  
THE BOLTLESS SHELF!



COURTESY ESSO, BATON ROUGE, LA.

**Use fewer RACKS...**  
**save 30% floor space and labor!**

**with TRULY ADJUSTABLE  
BOLTLESS SHELF  
PALLET RACKS\***

Rack "Pallet Racks"—featuring truly adjustable boltless shelves makes possible neat, orderly and economical rack installations as shown above. Note the elimination of wasted space! The boltless shelf on 4" centers permits fast, safe changing of shelf openings to suit height of pallet load. Welded uprights can be spaced for any size shelf, and a 10 ton capacity unit can be erected by your own men in 20 minutes or less. Rack engineers will gladly show you how. Write us today.

\* Patented in U.S. and foreign countries

*Send for complete data!*

**RACK  
ENGINEERING COMPANY**

131 SIXTH STREET

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Distributors in Principal Cities

Plants: Connellsville, Pa.; Gardena, Calif.; Farnham, Canada; Slough, England

Circle No. 143 on Reader Service Card for more information

**LETTERS**

*Continued*

ceive the monthly issue of FLOW, so that members of this department can quickly be informed of recent developments in the field of material handling and to enable us to maintain a steady source of information for reference.

H. S. Pike  
Western Electric Company, Inc.  
New York, N. Y.

**Braun Pledges  
High Standards**

To FLOW:

I was very happy to see the article on page 69 of the July issue of FLOW covering the inauguration of the Material Handling Equipment Distributors Association in Chicago, and wish to take this opportunity of expressing, on behalf of our organization, our sincere appreciation for the splendid manner in which you have covered the subject.

As with all new organizations, we have much work to do on behalf of all dealers of material handling who qualify under our objectives and code of ethics, and you will be interested to know that we are making much progress in whipping these things into shape. We expect soon to make a drive of the entire field so that we may not only increase our membership but assure the manufacturer, the user and the public generally that our organization pledges full support in the advancement of the art of material handling to its highest standards.

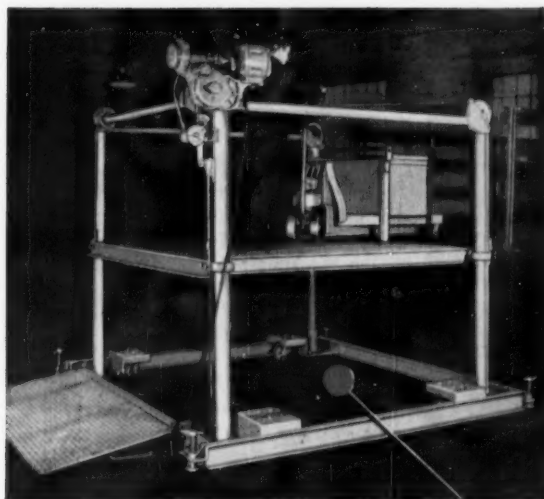
Robert H. Braun, President  
Material Handling Equipment Distributors Association  
Washington, D. C.

**Wants Stair-Climbing Truck  
To FLOW:**

We are interested in a hand truck with a capacity of 250 to 300 pounds that can go up and down stairs, and would appreciate it if you would advise us the name of the manufacturer of such a truck.

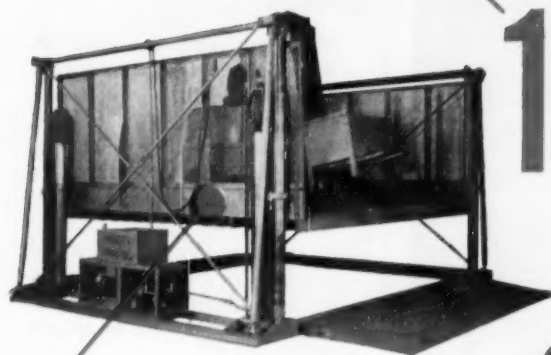
We know that there is a wheel

**FLOW**



# 3 Ways

to Make Materials-Handling  
Easier, Faster and SAFER  
with  
**COLSON**  
LIFTING EQUIPMENT



2

## The "Four Poster"

The big brother of the Leveler, this heavy duty machine requires no expensive pit or sub-surface work of any kind. Five standard models, with lifts from 10' to 17', have capacities to 12,000 pounds. Platforms in standard widths and lengths from 5' to 12'. Consult us for "special" lifts and sizes beyond these stated capacities.

1

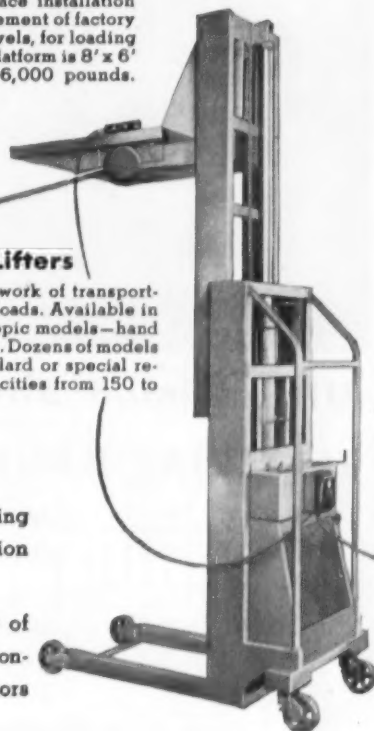
## The COLSON Leveler

Can be installed anywhere, inside or out, as a portable or permanent installation. No expensive sub-surface installation required. Ideal for movement of factory trucks between floor levels, for loading trucks or freight cars. Platform is 8' x 6' 6", lift is 5', capacity 6,000 pounds.

3

## COLSON Lifters

Make quick easy work of transporting and stacking loads. Available in single and telescopic models—hand or power operated. Dozens of models available for standard or special requirements. Capacities from 150 to 3,000 pounds.



COLSON manufactures lifting equipment to meet almost any materials-handling need—from 150 to 12,000 pounds. All are designed for easy, simple operation and maximum safety—built up to a standard, not down to a price.

Whatever your requirements—it will pay you to consult COLSON, maker of the nation's most varied line of materials-handling equipment. Write us or consult your local phone book (under "Trucks—Industrial"; "Casters" or "Elevators—Portable") for the COLSON office near you.

Write today for free booklet "COLSON Lifting Equipment"

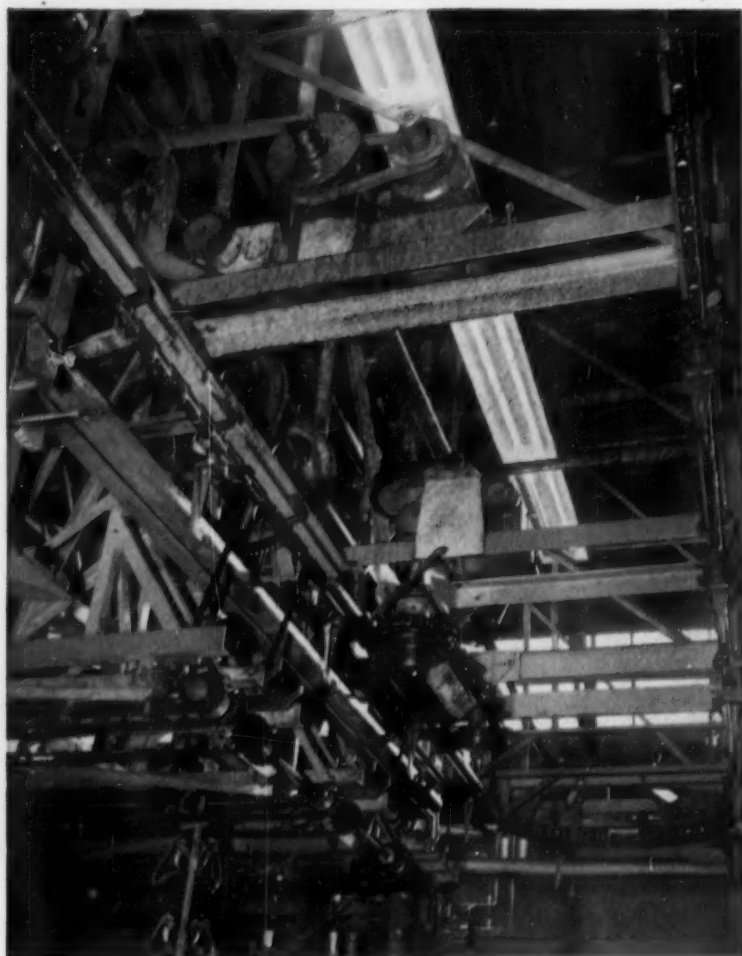
**THE**



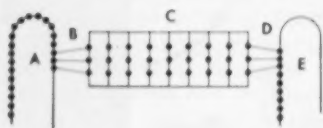
Casters • Hand Trucks • Lift-Jack Systems • Hydraulic,  
Electric and Mechanical Power Lifts and Transports

**CORPORATION**

**Elyria, Ohio**



## Ultra-Timed and Synchronized FULLY AUTOMATIC MATERIAL HANDLING SYSTEMS

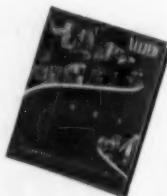


The installation illustrated handles three individual loads simultaneously. The loads unhook from conveyor "A", pass through transfers "B", hook to cross-bar conveyor "C". Operation completed, loads unhook, transfer through "D" to "E".

This is one of the scores of special-purpose material handling systems designed by Allied. Allied Studies your problem, Designs—Fabricates—Erects the units or systems needed to solve the problem.

*Consult Allied today!*

Ask for a  
copy of Allied  
Catalog 953



**ALLIED** STEEL AND CONVEYORS, INC.

17319 HEALY AVE., DETROIT 12, MICH.

Circle No. 6 on Reader Service Card for more information

## LETTERS

*Continued*

chair for invalids that goes up and down stairs, and wonder if it isn't possible to have a hand truck the same way. We think it has three wheels that lock up when traveling on the stairs.

Humbert Armao  
Monopearl Inc.  
Providence, R. I.

*There is a truck such as described, and our Reader has been so informed.*

## Forty Years Ago

To FLOW:

About 40 years ago most department stores in the country used an overhead cableway conveyor for transporting lightweight merchandise from the sales counter to the bundle counter and return to the sales counter after wrapping.

We have an immediate demand for a system of this type and would appreciate any assistance you may offer us in locating a source of supply, or information in respect to the design.

E. H. Striegel  
Equipment Associates, Inc.  
Wyckoff, New Jersey

*Advances in overhead handling have, of course, been made in the past forty years. For the latest information on the subject, we have referred Reader Striegel to manufacturers of the equipment.*

## Suggests Lightweight Strapping tool

To FLOW:

Tie wire for line post and top rail on chain link fence all over the world are, as far as we know, put on by hand with pliers.

It appears to use that there would be a very fine market for a lightweight, one man operated, strapping tool using eight or nine gauge aluminum wire off of a coil, carried by the operator. We, for one, could surely use a time saver in this operation.

Seth Birdwell  
Birdwell Fence Company  
Beaumont, Texas

FLOW

Circle No. 21 on Reader Service Card







## AUTOMATIC TRANSPORTATION COMPANY

DIVISION OF THE YALE & TOWNE MANUFACTURING COMPANY

GENERAL OFFICES AND FACTORY

101 WEST EIGHTY SEVENTH STREET • CHICAGO 20, ILLINOIS

### Industrial Leaders Solve Materials Handling Problems The "Automatic" Way

It is often said that, "The smart dollar goes where it buys the most for its spender." If that is true, what should we expect today's "smart dollar" to buy in materials handling trucks?

The answer might very well be found in the materials handling records of such industrial leaders as Ford Motor Company, The Champion Paper and Fibre Company, Bauer & Black, Westinghouse Electric Corporation, Sears, Roebuck and Co., and scores of others in every branch of industry. All use Automatic Trucks extensively in their materials handling operations.

In selecting Automatic Trucks, they were undoubtedly influenced by Automatic's low cost per year of service. Automatic Trucks simply don't know when to quit. Hundreds long since "written off" are still serving faithfully.

Surely, therefore, there must be a cost-cutting "Automatic" solution for your materials handling problem. So, why not get all the facts? Mail us the coupon on the fourth page of this insert.

Sincerely yours,

*John A. Baldinger*  
John A. Baldinger  
General Manager

JAB:rs

# Automatic Trucks Serve



Automatic trucks help speed shipment of 90,000,000 lbs. of Champion paper monthly from 3 mills to all parts of the world...

The Champion Paper and Fibre Company, with mills at Hamilton, Ohio; Canton, North Carolina; and Pasadena, Texas, takes pride in providing *on schedule*, all the quality paper that busy paper merchants, converters, printers and publishers need. Six days a week, carriers roll out into the roads bearing paper to every part of the U. S. A. and to harbors for export to every part of the globe.

# Champion Paper Co...

d'Arzies



*One of the shipping departments at Champion's Ohio Division.*

Mechanized materials handling is, of course, a "must" and *Automatic Trucks* are used not only for low cost operation but also for their exceptional dependability. Four of Champion's extensive "Automatic" fleet appear above in just one department of Champion's Ohio Division. Many more are constantly at work expediting the manufacture and shipment of Champion Papers in all three plants.

**Automatic.**  
ELECTRIC TRUCKS

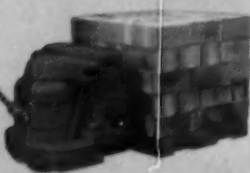
*Lighten*  
LIFE'S LOADS

**World's Largest Exclusive Builder  
of Electric-Driven Industrial Trucks**

There's an Automatic Truck Keyed  
to your specific needs...see next page



**TRANSPORTER**—Moves tons at the touch of a button...raises loads to moving height in seconds. 4,000 and 6,000-lbs. capacities.



**TRANSTACKER**—Ideal for working in narrow aisles and where floor or elevator capacities are limited. Available in capacities up to 4,000 lbs.



**DYNAMOTIVE**—America's first gas fork lift truck with electric transmission. No clutch! No gears to shift! 4,000 to 10,000 lbs. capacities.



**MODEL FFE "DOCKER"**  
Compact standup end-control fork lift truck, 1,000 to 3,000 lbs. capacities. For congested area and loading dock jobs.

## You Too Can CUT MATERIALS HANDLING COSTS

**As much as 50%...or More!**

Actual case histories show costs cut, production accelerated and storage capacity increased as much as 50% by Automatic Trucks keyed to the specific job!

**SKYLIFT GIANT**—Designed for heavy-duty handling. Available in capacities from 20,000 to 80,000 lbs. Fork and ram trucks.



Accurate records kept by hundreds of Automatic users show tremendous savings in time, storage space and costs starting the moment that Automatic Keyed-to-the-job trucks took over their materials handling operations. Your own materials handling problems can unquestionably be solved in the same way and with equal profit. So, whatever your business, be sure to find out how much it can be helped by the use of Automatic Trucks.



**SKYLIFT**—The popular Model BF is furnished in capacities from 1,500 to 4,000 lbs., rated for loads up to 48" long.

Even though capital outlay for truck purchase may be inexpedient just now, you can still avail yourself of "Automatic" savings without waiting. Lease the truck you need and let savings pay the cost. Or, a modest down payment will bring immediate delivery and you can pay off the balance with convenient extended payments.

But you'll want all the facts! You'll find them in a new, different kind of book written by a well-known materials handling specialist. Wide variety of actual case histories included. Get your copy at once. No obligation. Just mail the coupon.

Send Today For **FREE** Automatic Solution of Your

Materials Handling Problems...

**Automatic**

141 West 87th Street, Dept. P-5  
Chicago 20, Illinois

Please rush to me, without cost or obligation, my copy of the "Materials Handling COST CUTTER". ( ) Also your new folder on the Automatic "Earn-its-own-Way" Plan.

Firm .....

By ..... Title .....

Street .....

City ..... Zone ..... State .....



**MAIL COUPON TODAY**

**Automatic**

WORLD'S LARGEST EXCLUSIVE BUILDER OF  
ELECTRIC DRIVEN INDUSTRIAL TRUCKS

®Trade Mark Registered

UTHO IN U.S.A.

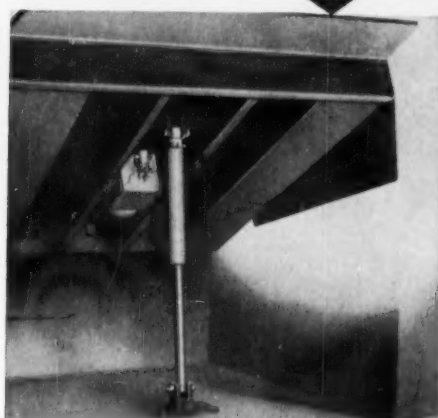
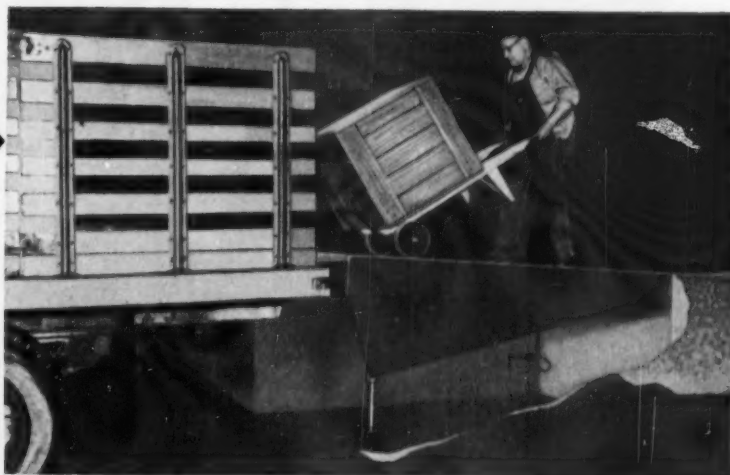


# NEW! Versatile... Easily Installed!

## GLOBE TRANS-O-MATIC RAMPS

To speed loading and cut handling costs, Globe's new Trans-O-Matic Ramps bring dock level to truck bed level with fast push-button control. Platform measures 6' x 8' 4" including 14" all steel lip.

Sturdy hydraulic jack is operated by power "package" consisting of motor, pump, reservoir and valves. Entire mechanism is weather-protected and snugly mounted between supporting box members for extra protection.



### CHECK THESE AUTOMATIC AND SAFETY FEATURES...

- ✓ Ramp "floats" automatically with changes in truck bed height.
- ✓ Automatic safety lock holds ramp in fixed position when truck pulls away from dock.
- ✓ At platform level, ramp locks in place to accommodate cross-traffic and storage.
- ✓ Skirts at sides provide full protection as toe guards.
- ✓ Non-slip checkered steel plate assures firm footing.

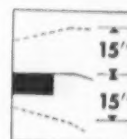
### MULTIPLE SAVINGS—INCREASED DOCK CAPACITY

Truck loading and unloading is smooth and safe... costly rehandling of goods is eliminated... when Globe Trans-O-Matic Ramps go into action on your loading dock.

Because goods move swiftly across platform without interruptions, your present dock area can handle two or three times more freight. Material handling costs are substantially reduced.

### 25% GREATER RANGE

Lip of steel ramp moves 15" up or down from horizontal to provide full 30" travel. Ramp "floats" with rising or lowering action of truck or trailer floor. Unique lip design provides smooth roll-over.



### NO EXCAVATION OR PIPING

Entire Trans-O-Matic mechanism is *above ground*, permitting quick, low-cost installation. If need be, complete ramp can be easily moved and relocated without loss.

### BOX CONSTRUCTION PROVIDES EXTRA RIGIDITY

Two parallel box members, of 1/4" steel plate, reinforce ramp and provide added strength without weight. Ramp sustains roll-over weight of 20,000 lbs., and storage loads up to 400 lbs. per sq. ft.

# GLOBE

## TRANS-O-MATIC RAMPS

PLANTS: DES MOINES—PHILADELPHIA—LONG BEACH, CALIF.

Clip today  
for free copy

GLOBE HOIST COMPANY  
East Mermaid Lane at Queen Street  
Philadelphia 18, Pennsylvania

F-720-TR

Please send me more information on Globe Trans-O-Matic Ramps together with FREE booklet "Case Studies in Modern Lifting."

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_



SEPTEMBER, 1955

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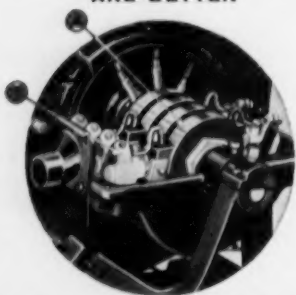
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Constant, Trouble-Free  
Traveling Power with . . .

**APPLETON  
REELITE®**

**WHY APPLETON REELITES  
ARE BETTER**



- Copper collector rings (A) are precision machined and have ample capacity to carry rated current.
- Brushes (B) are set in a floating tension assembly to maintain alignment and constant pressure.
- Grease-packed ball bearings and spring housing require no maintenance.

*No Shut Downs, No Man-Hours Lost! . . .  
Power When and Where You Want It!*

APPLETON Reelites speed up production . . . with safety . . . because they pay out and retrieve power lines for moving machinery . . . eliminating tangled lines and broken or smashed lines.

In heavy industry, though moving power is important . . . tangled or broken power lines remain a constant source of trouble. In light manufacturing, moving power can be the main factor in achieving "automation." No matter what your power or capacity requirements are, there is an APPLETON Reelite to do a *constant, trouble-free* job year in and year out. Write for details today . . . you'll be glad you did!

*Sold Exclusively Through Selected Wholesalers*

**APPLETON ELECTRIC COMPANY**  
1729 Wellington Avenue • Chicago 13, Illinois

*Also Manufacturers of:*



Explosion  
Proof  
Fixtures



Malleable  
Iron Union  
Fittings



Industrial  
Lights



"ST" Series  
Connectors

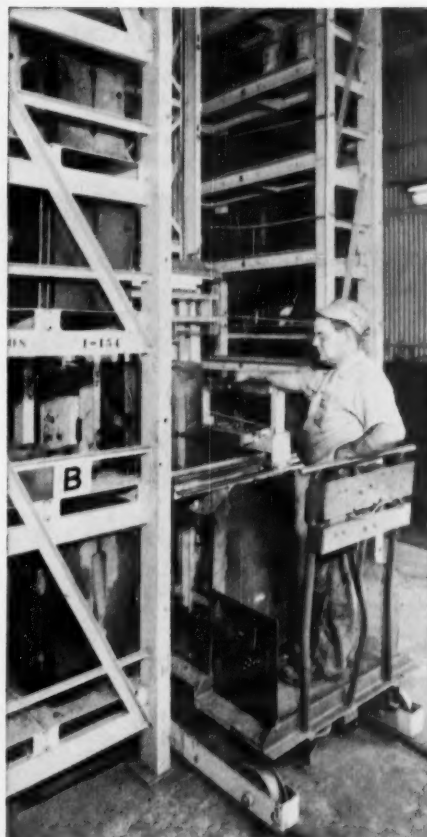


Outlet  
Boxes

**Rely on APPLETON . . . The Standard for Better Wiring**

Circle No. 5 on Reader Service Card for more information

# A 3000 lb. die handled like a feather with these special Economy die-handling Lifters



Push-button control for elevating the platform, propelling the machine down the narrow aisles, and moving the dies in and out of the racks, gives finger-tip high speed handling. The storage capacity is multiplied ten times the floor area and with every die located for immediate selection.

This die handling system, Economy engineered and built, is an example of how materials handling problems can be solved by Economy engineers who have specialized in custom-built machines for over 50 years.

Our representatives, trained in engineering, are located in all principal cities. Why not call one in on your material handling or overhead servicing problem?

## ECONOMY ENGINEERING CO.

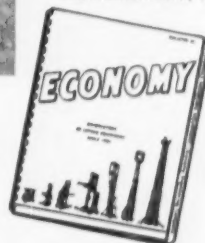
4524 W. Lake St., Chicago 24, Ill.

New York Office

342 Madison Ave., New York 17, N. Y.

Write for new Catalog No. 55 Forty pages of pictures and suggestions for special and standard machines. Every plant manager and maintenance engineer should have this catalog.

## Economy makes a complete line of standard lifters



Serral Racks

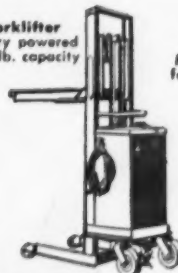


Elevating Table

Shedlifter  
for handling dies



Worklifter  
battery powered  
1000 lb. capacity



Model PUL  
for overhead  
service



Hi-Reach  
telescopes  
up to 100 ft.



# Tiger Brand is the

**Architects:**

Shaw Metz & Dolio

**General Contractor:**

Herlihy Mid-Continent Company

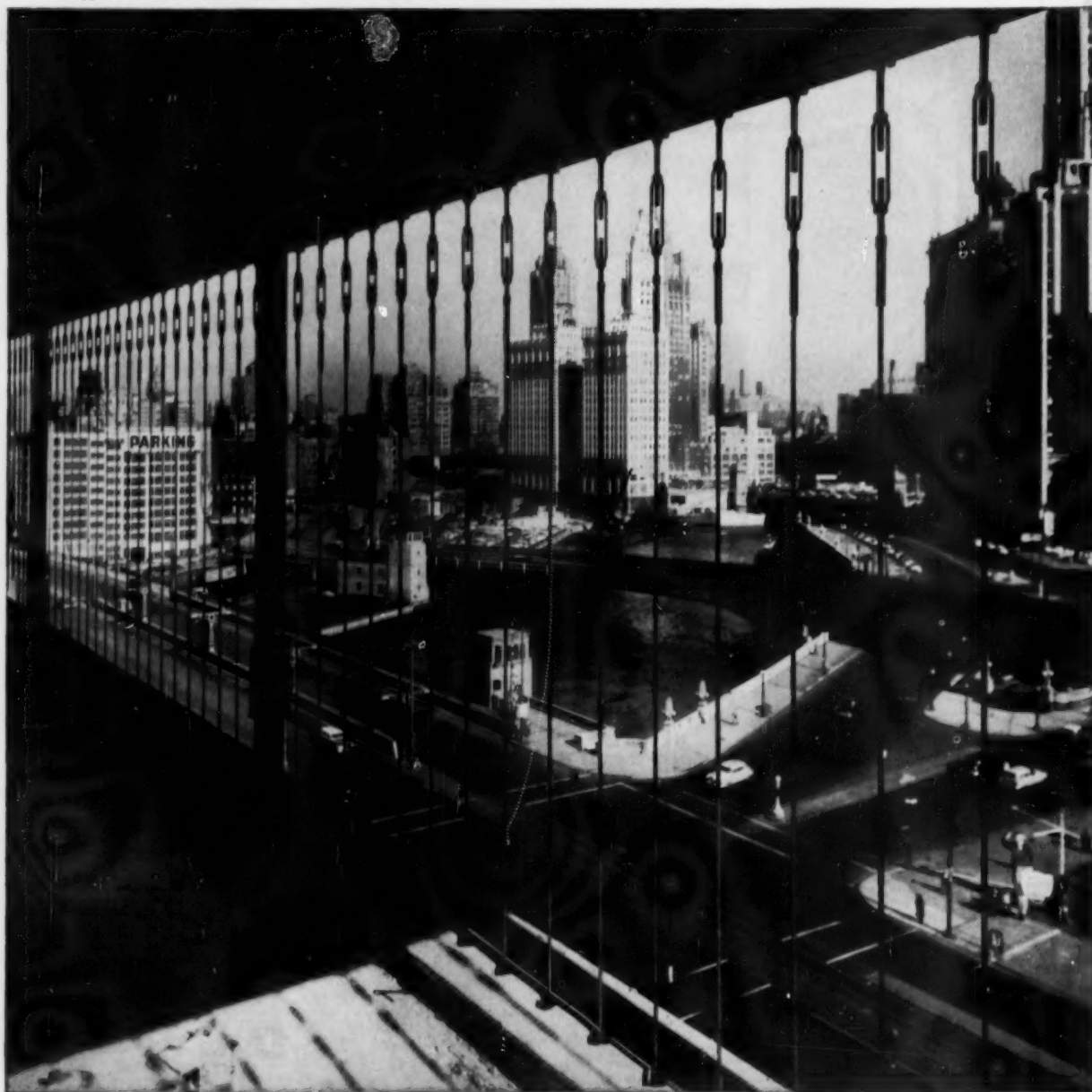
**Sub-contractor:**

(Erection of cable assemblies)

Rippel Architectural Metals, Inc.

## Peekaboo Wall.

In Chicago's newest parking garage, the architects wanted a wall material that was both beautiful and functional, one that would stay that way for years without maintenance. They took off into the blue and designed themselves a unique *wall of strand*—Tiger Brand Stainless Steel Strand. This stainless steel strand makes a striking appearance, resists torsion, and was easy to install. American Quality Springs provide the tension (1,000 pounds) to keep the strand taut and straight.



Circle No. 15 on Reader Service Card for more information



# RIGHT Rope for these jobs...

## Pre-fab Steeple.

It would have been costly and time consuming to erect this steeple piece by piece at the site. So it was pre-assembled, then lifted into place with a mobile crane. This was no easy lift—if you doubt it, try dangling a 5-ton church steeple on the end of a 100-ft. boom sometime and see how it acts. In this case, the operator made the lift quickly and with no trouble. He could count on the strength of a  $\frac{3}{4}$ " Tiger Brand Hoisting Rope for safety. The smooth spooling of this rope helped him maneuver the spire into position.

The Right  
Wire Rope  
will do  
the trick!



## On Any Job.

Hundreds of combinations of strengths, sizes, constructions, lays, and steels are available in the complete line of Tiger Brand Wire Ropes. As a result, you can get a Tiger Brand Rope to suit every lifting job you will ever encounter. And you can depend on its performance. Tiger Brand has proved in actual service that it lasts long. Get in touch with your local Tiger Brand Distributor next time you need dependable wire rope.



## AMERICAN STEEL & WIRE

DIVISION

UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS

UNITED STATES STEEL EXPORT COMPANY, NEW YORK

# USS AMERICAN TIGER BRAND WIRE ROPE

*Excellency Performed*



UNITED STATES STEEL

**THANKS TO GOULD RESEARCH**



**WE SEPARATE**

*Oxide Particles*

**40**

**MILLIONTHS**

**OF AN INCH**

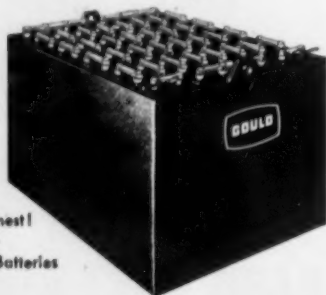
**IN SIZE!**

## **TO GIVE YOU GREATER BATTERY CAPACITY!**

**I**llustrated above is a Thompson Classifier in the Gould Battery Research Laboratory at Depew, N. Y. It is used to separate, by flotation, particles of lead oxide so small that they'll pass through the finest sieve made.

Particle separation is important in achieving uniformity of oxide . . . and battery capacity and life are helped by having each type of oxide fall within a specific particle size range.

This method of particle separation quickly determines which oxides are best for various types of Gould Batteries. Another reason why you get better batteries from Gould through research.



America's Finest!  
**GOULD**  
Industrial Truck Batteries

© 1955 Gould-National Batteries, Inc.

**GOULD**  
**Batteries**

• **GOULD-NATIONAL BATTERIES, INC.**  
TRENTON 7, N. J.

**"BETTER BATTERIES THROUGH RESEARCH"**

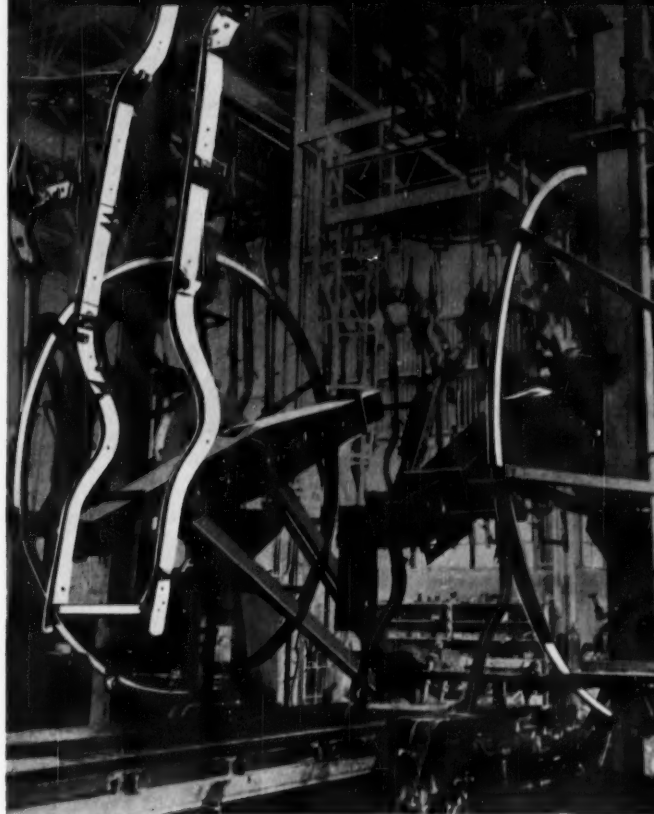
Always Use Gould-National Automobile and Truck Batteries

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# JERVIS B. WEBB

CONVEYOR ENGINEERING, MANUFACTURE, INSTALLATION and AUTOMATION

## FROM SLAT TO TROLLEY CONVEYOR



### *Automatically*

◀ Ferris wheel developed by Webb automatically lifts frames from assembly line and hooks them on overhead trolley conveyor.

... Another Example of



### *Automation*

Located in Philadelphia is one of the country's most modern plants for producing passenger car chassis frames. It is equipped with conveyor systems that automatically carry 3,000 of the large frames a day through various assembly operations, painting and shipping.

Slat conveyors are used in assembly and shipping departments while overhead trolley conveyors carry assembled frames through washing, painting and drying.

At the end of the final assembly line, frames are

Visit us at "The Production Engineering Show"—Navy Pier, Chicago

automatically picked off the slat conveyor by a unique two-arm Ferris wheel device (designed by Webb) and hooked on the overhead conveyor for washing and painting. Another automatic device, built by Webb, has three trunnion-mounted arms which pick frames off the overhead conveyor after painting and deposit them on the slat conveyor in shipping room.

For automatic handling of any size or type of material, Webb engineering experience and reputation is your best assurance of receiving the finest in conveyor automation.

September 6 to 16, 1955 • Booth 518

Write to us on your company letterhead and we will be happy to place your name on the Webb mailing list to receive factual technical information on conveyor installations, case history reports, and new product literature.

## JERVIS B. WEBB CO.

### *Specialists in Custom Conveyor Systems*

8935 ALPINE AVENUE • DETROIT 4, MICHIGAN

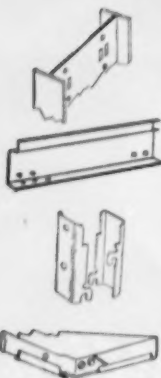
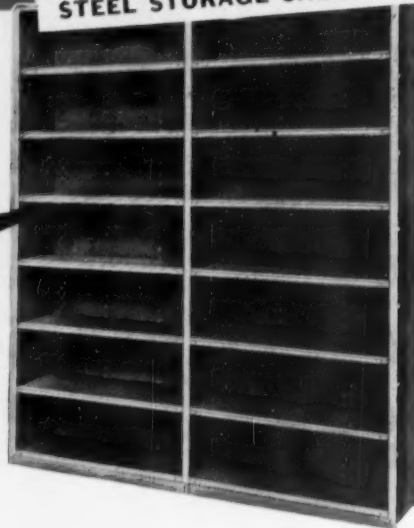
Offices and Representatives Throughout The World • FACTORIES: Detroit • Los Angeles • Hamilton, Ontario  
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SEPTEMBER, 1955

# DESIGNED *by DeLuxe* FOR INDUSTRY

*DeLuxe* STEEL  
STORAGE SHELVING  
CUTS INSTALLATION  
EXPENSE 50% OVER  
ORDINARY SHELVING

## STEEL STORAGE SHELVING



### ONE-PIECE BIN TYPE UPRIGHT

- I-Beam construction for greater rigidity
- Faster erection — no panels to bolt

### BOTTOM SHELF SUPPORT AND FLOOR ANGLE

- Distributes floor surface load evenly
- Permits shelving erection in vertical position — no sloping

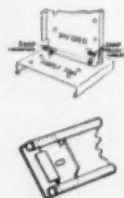
### BOLTLESS ADJUSTABLE SHELF BRACKETS

- Easy shelf adjustment — no tools needed
- 50% less nuts and bolts

### FACTORY IMBEDDED — SHELF REINFORCING

- 1 x 1/16" high carbon steel bar built in and returned around end flanges where load is carried

A section of sturdy, easily-assembled DeLuxe shelving — closed or bin type.



### SNAP-IN DIVIDERS

- Adds flexibility . . . dividers may be changed speedily to accommodate storage of new production parts

### CLIP-ON BIN FRONTS

- No bolts to bother with
- Quick "clip-on" action



## BAR RACK



Uprights bolted to cross-brace and footing. 13 gauge top ties are bolted to uprights as spreaders.



## STORAGE CABINETS



Neat rounded corners. Louvered backs for ventilation. Shelves adjustable without tools.



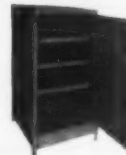
## FOREMAN'S DESK



Special rigid welded assembly for factory use. Adjustable to any floor surface.



## MACHINE STAND



Welded shelf of 22 gauge steel, three fixed 18 gauge shelves and 18 gauge top.



## DELUXE METAL FURNITURE CO.

323 Struthers Street  
WARREN, PENNSYLVANIA

A DIVISION OF ROYAL METAL MANUFACTURING CO.

Circle No. 56 on Reader Service Card for more information





## **New BAKER "FG"... the only gas trucks with a 6 MONTHS' WARRANTY**

"Balanced Design" a revolutionary concept in gas fork truck construction now makes possible a full 6 months' warranty on the new Baker "FG" line.

"Balanced Design" demands that every step in the overall design be determined in relationship to the ultimate purpose of the machine. Every component is engineered to its specific function. All elements matched and coordinated to work together for top efficiency, maximum dependable service and longest life.

The power plant, for example, is not a modified

automotive engine, but a heavy-duty engine specially designed for rugged industrial truck service... power rated to the specific capacity of the truck. Transmission, drive axle, brakes, lifting mechanism, etc., are then carefully engineered to match the power plant and meet the capacity requirements of the truck.

These are some of the reasons why Baker "FG" is the only gas fork truck with a full 6 months' warranty.

Baker "FG" gas fork trucks are available in 3,000, 4,000, 5,000 and 6,000 pound capacities. Specific bulletins are available.

**Baker**

handling equipment

**THE BAKER-RAULANG COMPANY**  
1219 WEST 80th STREET • CLEVELAND 2, OHIO

A subsidiary of Otis Elevator Company

5G-8

# NEWS VIEWS TRENDS

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## **RAIL-TRAILER TEAMS WITH CLARK MOBILVAN**

Development of Clark Equipment Company's new Mobilvan container system in the field of rail-highway freight transportation was given a boost when the firm teamed-up with The Rail-Trailer Company of Chicago. Formation of a new subsidiary, the Clark Mobilvan Corporation, to implement this program was announced by Eugene F. Ryan, president of The Rail-Trailer Company, who also heads the new corporation. While Clark Mobilvan Corporation has been organized as a wholly-owned subsidiary of Rail-Trailer, Clark Equipment Company maintains an option to acquire a controlling interest in the new firm and the right to name a majority of its directors. "We expect to demonstrate," said Ryan, "that a considerable volume of freight now moving in conventional types of equipment can be handled to better advantage in Mobilvans."

## **MATHEWS CONVEYER NOTES 50TH YEAR**

Fifty years ago in a blacksmith shop in Minneapolis, the company that is today Mathews Conveyor Company was born. Shortly thereafter, manufacturing and office space were set up in St. Paul, and then transferred in 1911 to Ellwood City, Pennsylvania, near the source of a principal raw material. Now, with three modern plants and engineering offices or sales agencies in most principal cities, Mathews Conveyor Company took time out on June 29 to celebrate the opening of its newly constructed office and engineering building in Ellwood City. At the same time company officials, strengthened by the firm's progress since its humble beginning, were making even greater plans for the future.

## **CROWN ZELLERBACH, GAYLORD TO MERGE**

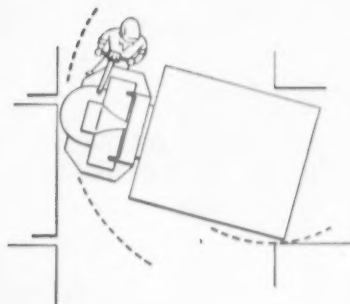
Crown Zellerbach Corporation and Gaylord Container Corporation have reached an agreement in principle under which Crown Zellerbach will exchange two shares of presently authorized but unissued common stock for each three shares of outstanding stock of Gaylord Container Corporation. Upon completion of the transaction it is the intention of Crown Zellerbach to increase its dividend rate in order that the present dividend income to Gaylord stockholders may be maintained. Crown Zellerbach is the largest western producer of printing, wrapping and specialty papers. Its forest lands and principal plants are in the Pacific Northwest and British Columbia. Gaylord's 16 converting plants and most of its 62 sales offices are concentrated in the midwest, east and south. Last year, Crown Zellerbach's sales amounted to some \$300 million, and Gaylord's sales were about \$90 million.

## **'56 PMMI PLANS**

Manufacturers of packaging machinery and allied products will display new developments at Cleveland, Ohio's Public Auditorium next year. Plans for the industry sponsored and managed exposition of the Packaging Machinery Manufacturers Institute were recently revealed by association President Tom Miller. Technical, educational and marketing sessions are being planned for the exhibit, scheduled for September 11-14, 1956.

# SQUEEZE

your aisles to 5' 3"



The Lewis-Shepard Electric JackStacker is the one high-tiering "walkie" that's best designed for your narrow aisles. Here's why:

**It's Extra Short . . .** The JackStacker has the shortest head-room of any standard walkie . . . lets you stack 40" long, 4,000 lb. loads to heights of 130" in aisles only 63" wide (48" long loads in 69" aisles).

**More Maneuverable, too . . .** exclusive L-S handle-head control makes it easy to operate the truck in tight quarters—with the handle in vertical position . . . all controls, including brake, are in handle-head permitting operation with handle in any position.

**Much More Stable . . .** large stabilizing casters on load carrying frame combined with rear wheels give 4 point support to load . . . assure maximum stability when high stacking. Get all the facts on this and other Lewis-Shepard Master trucks — the only *complete* line of materials handling trucks on the market. Send for catalogs — use the coupon below.

## HERE'S PROOF OF LEWIS-SHEPARD "WALKIE" TRUCK DEPENDABILITY

Listed are typical L-S reorders from blue-chip companies in various industries:

Amusement Goods	has 154 L-S — reordered 2
Electrical Goods	has 255 L-S — reordered 3
Rubber Goods Mfg.	has 57 L-S — reordered 4
Food Packer	has 70 L-S — reordered 2
Chemical Mfg.	has 52 L-S — reordered 3
Metal Mfg.	has 41 L-S — reordered 5
Grocery Chain	has 57 L-S — reordered 3



## LEWIS-SHEPARD

139 Walnut St., Watertown 72, Mass.

Please send

- ☐ L-S Master Line Catalog  
☐ L-S JackStacker Catalog No. 34

Name  Title

Company

Address

City  State

Circle No. 101 on Reader Service Card for more information

**SALEM-BROSIUS  
CONSOLIDATES  
ALL OFFICES**

A five year expansion and integration program was completed recently by Salem-Brosius, Inc. when it formally opened its new headquarters plant and office building in suburban Carnegie, Pennsylvania. The new 27,000 square foot building brings all the firm's offices together under one roof for the first time since its founding. Ward A. Wickwire, Jr., president, said the centralization of offices following the merger and acquisition in the past five years of seven different companies having complementary manufacturing and engineering facilities has placed Salem-Brosius in an excellent competitive position. One of the companies recently acquired was Phillips Corporation, formerly Phillips Mine & Mill Supply Company.

**8TH YALE BRANCH  
OPENED IN DETROIT**

The eighth major branch outlet of The Yale & Towne Manufacturing Company has been established at 4466 Woodward Avenue, Detroit. Located in a modern 20,000 square foot building, the new unit offers complete display, sales, parts and service facilities, and is staffed with factory trained personnel. D. K. Wirth is branch manager, John R. Henderson sales manager, and Joseph Hanasack service manager of the new outlet.

**DOW GIVES \$300,000**

Gifts totaling more than \$300,000 for educational grants to 38 colleges and universities for the advancement of science and engineering for the academic year 1955-56 have been announced by The Dow Chemical Company. In announcing the aid-to-education program, Dr. Leland I. Doan, Dow president, said "Our company recognizes there is a growing need for industrial assistance to colleges and universities, and takes the position that industry has an obligation to society to help support education as an important instrument in industrial and cultural progress. As a result, our aid-to-education program has increased steadily over several years."

**HOBBS PURCHASED**

The entire business and assets of John W. Hobbs Corporation have been bought principally for cash by Stewart-Warner Corporation. John W. Hobbs, who founded the Springfield, Illinois company in 1938, will remain as president, and no changes are expected to be made. "The acquisition represents another step in Stewart-Warner's program for further diversification and expansion of its product lines," said Bennett Archambault, Stewart-Warner president.

**MOBILE  
PACKAGING  
SERVICES**

Establishment of an Industrial Packaging Division which includes the custom designing of scientifically engineered containers has been announced by Bekins Van and Storage Company. In addition to packaging and crating, the Division will also complete government or commercial export paper work, relieving the manufacturer of all responsibility from final production line inspection to acceptance by common carrier. A special feature of the department is the mobile packaging unit which travels to any location, equipped to handle items too delicate or bulky to be removed to a packaging area away from production facilities. Noble W. Jones, pioneer packaging engineer, heads the new division.



# AT LAST! Really Automatic Materials Handling...

IMPROVED PRODUCTION OF MACHINE OPERATORS  
INITIAL INSTALLATIONS SHOW  
SENSATIONAL SAVINGS  
IN HANDLING TIME—



Work receiving box in same stand  
conserves floor area.



Big hopper holds work supply during  
box changing.

Here's materials handling history  
FLOW-MATION\* by Powell—the  
greatest innovation in materials  
handling in a decade.

Your standard lift truck—no special  
attachments needed—sets a  
FLOW-MATIC\* box on a special  
rack. The box opens under its own  
weight, discharging contents into  
work level hopper. Operator drops  
finished piece through chute into  
hopper to second box below. It's  
as simple as that.

Those who have seen it in action agree—  
there's nothing like it for cutting production  
time, reducing handling hours, lowering  
operator fatigue, conserving floor space—  
for saving you time and dollars. But get the  
entire story. See your Powell representative.  
He has full literature and working models.  
Or write direct to Powell for your copy of  
Powell FLOW-MATION\* Systems, a specially  
prepared pamphlet that explains the  
entire system.

\*FLOW-MATION and FLOW-  
MATIC are trade names of  
Powell Pressed Steel Co.—  
Product Patent Pending.



Get Your  
Free Copy

## flow-mation\* Systems

the POWELL PRESSED STEEL Co., Dept. 295, HUBBARD, OHIO

I would like a copy of FLOW-MATION\*, the illustrated pamphlet that  
gives full details of the new Powell FLOW-MATION\* System.

Name \_\_\_\_\_

Title \_\_\_\_\_ Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Mail Coupon Today →

# how many uses for **DEXION** in your plant?



RACK



DINING TABLES



STORAGE



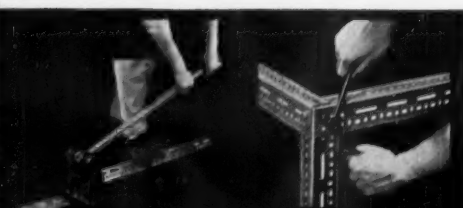
DIE RACKS



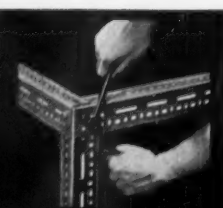
TABLE AND BINS



FILING TABLE



Easy to cut. One stroke of DEXION cutter saves time.



Simple to connect. Use only two wrenches.



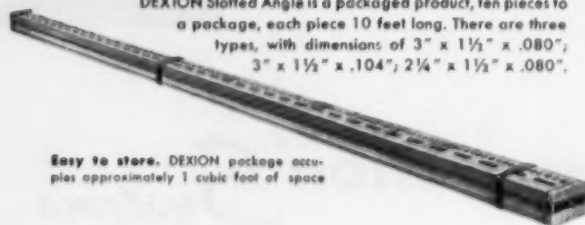
DEXION panels. For shelving to support heavy loads.



Re-usable. Dismantle—re-build into other equipment.

## Here's why you'll want DEXION Slotted Angle over any other framing material

Only your imagination limits the applications of this ingenious slotted angle framing material. Users discover that they can build whatever they need—when they need it—and build it cheaper! Easily dismantled, DEXION Slotted Angle can be reused in new ways to meet changing needs. There's no waste! And anyone who can use a wrench and a saw (or DEXION cutter) can build with this precision-made slotted angle.



DEXION Slotted Angle is a packaged product, ten pieces to a package, each piece 10 feet long. There are three types, with dimensions of 3" x 1½" x .080"; 3" x 1½" x .104"; 2¼" x 1½" x .080".

Easy to store. DEXION package occupies approximately 1 cubic foot of space.



GET the exciting new  
**DEXION IDEA BROCHURE**,  
which gives you full information.  
Write direct to the address shown  
below, Dept. 9-B.

DEXION DIVISION

# ACME STEEL COMPANY



2840 ARCHER AVENUE, CHICAGO 8, ILLINOIS  
Circle No. 20 on Reader Service Card for more information

# Louden Selectomatic-Automatic Dispatch

**Louden's contribution to AUTOMATION here saves \$25,000 a year**

Louden Selectomatic-Automatic Dispatch is an application of automatic, unattended operation to materials handling and as such is serving many large industrials the country over. It is further indication of Louden's ability to turn the fundamental advantages of overhead handling to greatest account. The typical installation shown here is in the Johnson Motors, Waukegan, Ill., out-board manufacturer plant. Its function is to carry aluminum parts through a Lyfaniting (anti-corrosion) process. The moment its basket is loaded by one man and the button pushed, it carries on by itself, dipping basket contents into a series of tanks for stipulated periods of time,

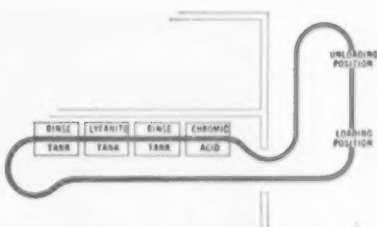
and then running its load to a second man who unloads it. The Selectomatic-Automatic Dispatch System replaces a hand-operated monorail system and accomplishes in *one* shift what it used to take 3 shifts to do. On an initial investment of only \$16,000, this user is saving in excess of \$25,000 a year!

The availability of such equipment is a reciprocating testimonial to the breadth and penetration of Louden engineering. Truly Louden turns to greatest account the advantages of overhead handling—providing the finishing touch that makes the difference between "pretty good" and outstanding. Call in a Louden man for help on *your* handling problems.

## THE LOUDEN MACHINERY COMPANY

5309 Broadway, Fairfield, Iowa

A Subsidiary of Mechanical Handling Systems, Inc.



Louden Selectomatic-Automatic Dispatch embodies the principle of automatic control as applied to materials handling operations. In some installations, it even exemplifies true AUTOMATION. By combining monorail track, the appropriate current-carrying and current-controlling devices, motorized conveyors, and the appropriate type of carriers, the completely automatic and unattended handling, carriage and processing of many materials and parts are achieved. Impressive economies, production increases and quality improvement are the result.



New! Louden Shakpruf Electrification... for all monorail and crane installations. Hazards of open conductor bars now completely overcome by this exclusive Louden engineering development. Write for full details of this safe conductor system.



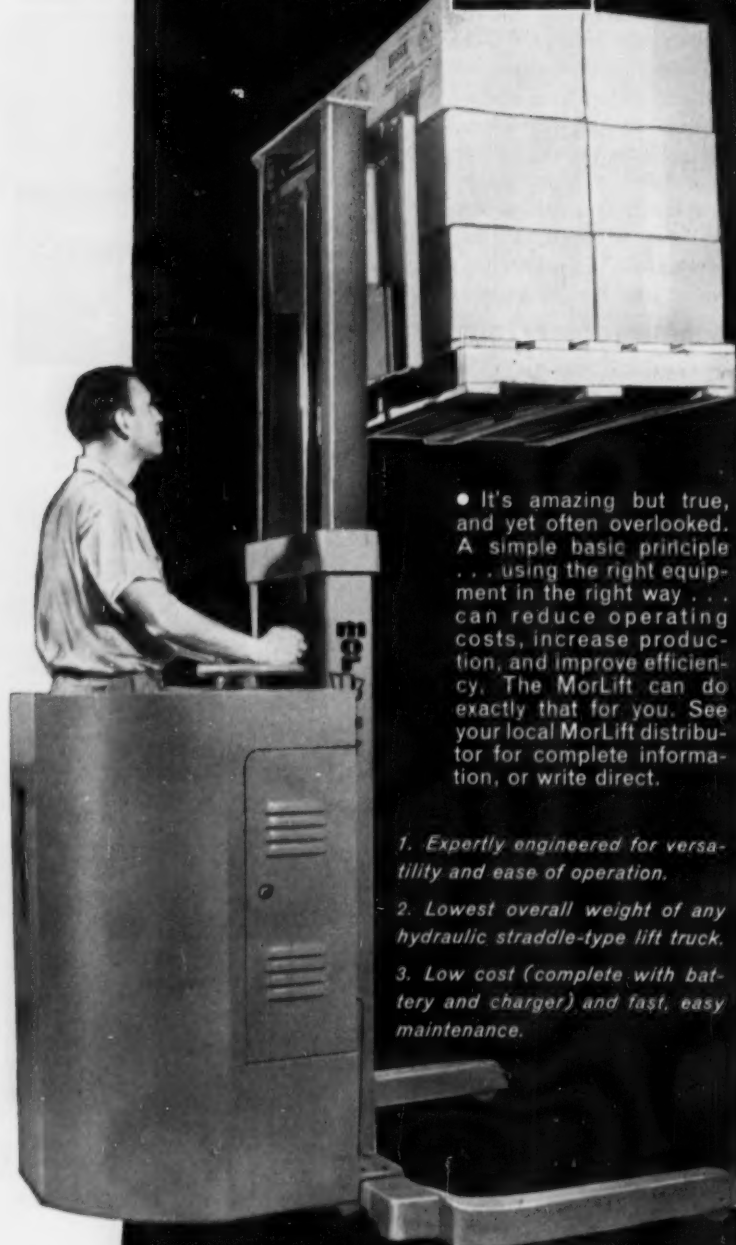
**Louden**  
MONORAIL & CRANES

SINCE 1867...THE FIRST NAME IN MATERIALS HANDLING

Circle No. 105 on Reader Service Card for more information

For the smartest move  
you'll ever make!

# morLift



• It's amazing but true, and yet often overlooked. A simple basic principle . . . using the right equipment in the right way . . . can reduce operating costs, increase production, and improve efficiency. The MorLift can do exactly that for you. See your local MorLift distributor for complete information, or write direct.

1. Expertly engineered for versatility and ease of operation.

2. Lowest overall weight of any hydraulic straddle-type lift truck.

3. Low cost (complete with battery and charger) and fast, easy maintenance.

**JOHN MORRELL MFG. CO.**  
222 DUNDEE AVE. ELGIN, ILLINOIS

Write to  
Dept. 121

Circle No. 122 on Reader Service Card for more information

## news from the SALES FIELD

Recently named as sales supervisor of the electric industrial truck and hydraulic lift divisions of **The Raymond Corporation** is **James H. Launder**. A graduate of Syracuse University, he joined the company in 1950, serving as staff assistant to the executive vice president. He is a native of Binghamton, New York, and served with the U. S. Navy in the Pacific theatre of operations during World War II.



**J. H. Launder** joined the company in 1950, serving as staff assistant to the executive vice president. He is a native of Binghamton, New York, and served with the U. S. Navy in the Pacific theatre of operations during World War II.

Elevation of **The Dow Chemical Company's** Minneapolis and Cincinnati field offices to full sales office rank, and plans for opening a new sales office in Buffalo have been announced by **Donald Williams**, vice president and director of sales. Also announced was the advancement of **Marion E. Teller** as manager of the Minneapolis office, **Edward C. Early** as manager of the Cincinnati office and **Eugene L. Martinez** as manager of the Buffalo office which is expected to open late this year.

The Standard Products Division of **Stephens-Adamson Mfg. Co.** has named the following 13 firms as authorized stocking distributors: **J. R. Banbury Equipment Co.**, Pittsburgh; **Southern Chemical Sales Co.**, Louisville; **P. J. Hagerty Equipment Co.**, Peoria; **Wisconsin Bearing Co.**, Milwaukee; **Buffalo Rubber &**



# ONLY

NOELTING

# Faultless

## TRIPLE GREASE SEALED

# CASTERS

## Have NEOPRENE VULCANIZED RETAINERS

(PATENT PENDING)



**LEAK-PROOF  
NEOPRENE  
RETAINER MOLDED  
AND VULCANIZED  
ON UPPER BEARING  
SWIVEL RACEWAY.  
PATENT PENDING.  
(not just a metal ring)**

**THRUST BEARING  
GREASE RETAINER  
TIGHTLY FITTED AROUND  
FORMED, HARDENED  
RACEWAY. CAN BE  
EASILY REMOVED FOR  
CLEANING OR INSPECTION.**

**NEOPRENE RING  
PERMANENTLY ATTACHED  
TO METAL WASHER AND  
PRESS FITTED INTO HUB.**

**FAULTLESS 900GS SERIES GREASE  
SEALED CASTERS ARE AVAILABLE  
WITH HARD OR CUSHION TREAD WHEELS  
IN 5", 6" OR 8" SIZES**

Manufactured by

**FAULTLESS CASTER CORPORATION**

Evansville 7, Indiana

Offices in Atlanta, Baltimore, Boston, Buffalo, Chicago, Cleveland, Dallas,  
Detroit, Grand Rapids, High Point, Houston, Indianapolis, Los Angeles,  
New York, Philadelphia, St. Louis. Canada: Stratford, Ont.

**1** Molded Neoprene grease seal is vulcanized to upper bearing raceway and snugly fits corrugated ring in top plate. Keeps lubricant in—keeps dirt and water out of swivel bearing. Top surface snaps back to snug fit after old grease is flushed out. Functions normally with standard grease in temperatures as low as 0°F. and as high as 200°F.

*Permanent film of grease positively reduces friction and accelerates swiveling.*

**2** Thrust bearing grease retaining cup provides no-leakage protection and keeps lower ball race free of dirt and moisture. Keeps swivel head lubricated indefinitely. Easily removed, as required.

**3** Wheel bearing Neoprene seal is permanently attached to washer and press-fitted into hub. Keeps foreign matter out of roller bearings and ball bearings in hub. Locks in lubricant and assures free rolling of wheels.

**4** Double ball bearing construction . . . two full rows of hardened, ground, and polished large diameter balls operate in smooth, lubricated raceways for effortless swiveling. All bearing surfaces hardened.

**5** Handy pressure type grease fittings . . . same size for both swivel and wheel bearings. Fitting is permanently attached for life of caster. Easy to reach for fast, efficient maintenance. No disassembly necessary for lubricating caster.

**6** Heavy gauge corrugated top plate . . . deeply embossed for maximum load capacity. Same size top plate and mounting hole c-c in all sizes of both rigid and swivel casters in this Series. Available in 3 different top plate and mounting hole c-c sizes, in 900GS Series Swivel Plate Casters.

**7** Case hardened raceways . . . all bearing raceways are full hardened for years of trouble-free swiveling action. Top ball race welded to caster horn. Lower ball race accurately machined from solid steel bar stock. Precisely formed and fully hardened ball retainer with deep skirt fitted around balls in thrust bearing for high efficiency and long life.

**8** Heavy gauge caster horn . . . full drawn steel horn will not bend under maximum loads.

**9** Large diameter king pin . . . securely holds top plate and machined lower ball race cone in perfect alignment.

**10** Wide choice of Faultless wheel diameters and treads for load ratings up to 650 pounds per caster.

# Faultless

## VULCANIZED NEOPRENE GREASE SEAL

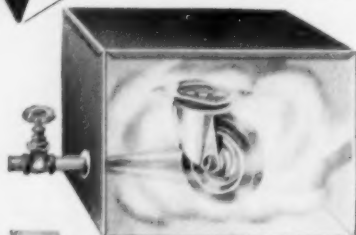
(PATENT PENDING)

Positive protection for swivel and wheel bearings wherever steam, dirt, chemicals, water are encountered

### SEE HOW THIS GREASE SEAL WITHSTANDS HIGH-PRESSURE TESTS

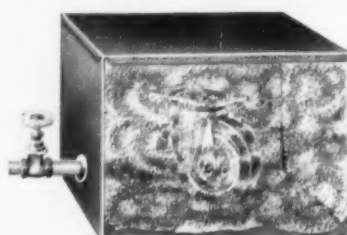
#### Live Steam

A stock 918-6GS Caster, with lubricated swivel ball bearings and wheel roller bearings protected by Faultless Neoprene grease seals is set upright in a steel box that is closed against air leaks. Live steam under pressure is piped into the metal box for a period of two minutes.



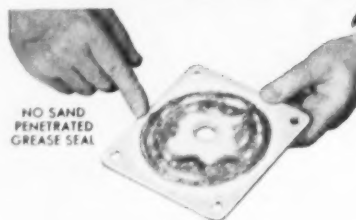
GREASE REMAINS INTACT AROUND BEARINGS

Faultless Caster swivel disassembled after steam test. Grease is still intact and giving full protection to bearings and raceways. The grease has not been thinned out by steam.



#### Sand Blast

The 918-6GS Caster is removed from the steam chest and set in a duplicate steel box with a  $\frac{1}{2}$ " thickness of fine white sand on the bottom. Eighty pounds per square inch of pressured air is blown into the box, creating a swirling turbulence sufficient to force sand into the bearing areas of ordinary casters.



NO SAND PENETRATED GREASE SEAL

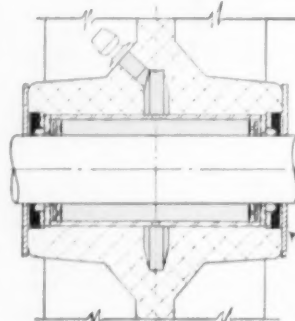
No particles of sand are present in the bearing assemblies. The Faultless molded Neoprene grease seal circumscribing and vulcanized to the upper ball raceway, and the metal cup covering the king pin and sealing the lower raceway are completely effective.

The severe steam and sand tests shown above prove the superior sealing qualities of the Faultless Vulcanized Neoprene Seal. In ordinary service the swivel and wheel seals will retain lubricants indefinitely. The thin film of grease always present between the Neoprene rings and metal surfaces, positively reduces friction or drag and accelerates caster movement.

Old lubricants can be easily flushed out each time caster is relubricated—like changing oil in an automobile. Neoprene swivel bearing seal snaps back into snug fit after old lubricant is flushed out. Both wheel and swivel bearings are lubricated through separate pressure grease fittings of same type and size. No caster disassembly is necessary as on some types of grease seal casters.

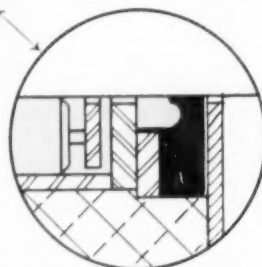
Plant floors stay cleaner and safer—no dripping oil. Casters stay well lubricated for long periods of time under normal usage with grease retaining features of the Faultless Series 900GS Casters. These qualities make the Series 900GS an ideal caster for production line trucks, since trucks so equipped rarely are pulled out for maintenance. Faultless 900GS is also the best type caster where dirt, water, high or low temperatures, or brine conditions exist.

SERIES 9700GS RIGID PLATE CASTERS are available with mounting hole spacings, top plate sizes, load capacities and overall heights to match companion Series 900GS Swivel Plate Casters listed below.



#### NEOPRENE HUB SEAL

Heavy Neoprene seal is formed around metal washer to lock grease within roller bearing. Washers with Neoprene are press-fitted into wheel hub. The Neoprene cross section reveals area provided to lock grease against leakage and to provide free running wheel.



CASTER NO. WITH ROLLER BEARING WHEELS	WHEEL (Inches)	FACE (Inches)	KIND OF WHEEL	HUB LENGTH (Inches)	AXLE DIAM. (Inches)	LOAD CAP. EACH (Lbs.)	OVERALL HEIGHT (Inches)	SIZE OF TOP PLATE (Inches)	MOUNTING HOLE SPACINGS C-C (Inches)	DIAM. BOLT HOLES (Inches)	SWIVEL RADIUS (Inches)	APPROX. WEIGHT EACH (Lbs.)
906-5GS	5	1 1/4	Semi-Steel	1 1/4	3/4	550	6 1/4	5 x 5 1/2	4 1/8 x 4 1/2	2 3/4	4 3/8	6.5
*917-5GS		1 1/2	Rubber-tired	2	"	500	"	"	"	"	"	6
918-5GS		"	Vulcanized	1 13/16	"	200	"	"	"	"	"	5
923-5GS		"	Ruberex	"	"	300	"	"	"	"	"	5.75
929-5GS		"	Rockite	"	"	550	"	"	"	"	"	5
931-5GS		1 3/4	Plaskite	"	"	550	"	"	"	"	"	6
906-6GS	6	2	Semi-Steel	2 3/4	1	650	7 3/4	5 x 5 1/2	4 3/8 x 4 1/2	2 3/4	4 3/8	9
*917-6GS		"	Rubber-tired	2 3/4	"	650	"	"	"	"	"	7.75
918-6GS		"	Vulcanized	2 3/4	"	350	"	"	"	"	"	6.5
923-6GS		"	Ruberex	"	"	350	"	"	"	"	"	7
923-6B-GS		1 1/4	Ruberex	"	"	325	"	"	"	"	"	6.5
929-6GS	6	2	Rockite	"	"	650	"	"	"	"	"	6.5
929-6B-GS		1 3/4	Rockite	"	"	475	"	"	"	"	"	6
931-6GS		2	Plaskite	"	"	650	"	"	"	"	"	6.5
906-8GS	8	1 3/4	Semi-Steel	2 3/4	3/4	550	9 1/2	5 x 5 1/2	4 3/8 x 4 1/2	2 3/4	5 13/16	11
*917-8GS		1 1/2	Rubber-tired	2 3/4	"	500	9 3/8	"	"	"	"	8.5
918-8GS		2	Vulcanized	2 3/4	"	420	9 1/2	"	"	"	"	7
923-8GS		1 1/4	Ruberex	"	"	400	"	"	"	"	"	10
923-8 x 2GS		2	Ruberex	"	3/4	500	"	"	"	"	"	8
929-8GS	8	1 1/2	Rockite	"	3/4	550	"	"	"	"	"	10
929-8 x 2GS		2	Rockite	"	3/4	650	"	"	"	"	"	7
931-8GS		1 3/4	Plaskite	"	3/4	600	"	"	"	"	"	8.5

\*Ball Bearing Wheel, Bolt and Nut Axles. Cadmium Finish.

Also available with top plate 5" x 5", mounting hole spacings 4" x 4". Add prefix "A", e.g., A917-8GS.

Also available with top plate 4" x 7", mounting hole spacings 3" x 6". Add prefix "D", e.g., D923-6GS.

For a demonstration of the Faultless 900GS Caster, and how it can overcome your particular problems, call your nearest Faultless Distributor or write to

**FAULTLESS  
CASTER  
CORPORATION**  
EVANSVILLE 7, IND.

Ptd. U.S.A.  
Copyright 1955  
Faultless Caster Corp.

## SALES FIELD

*Continued*

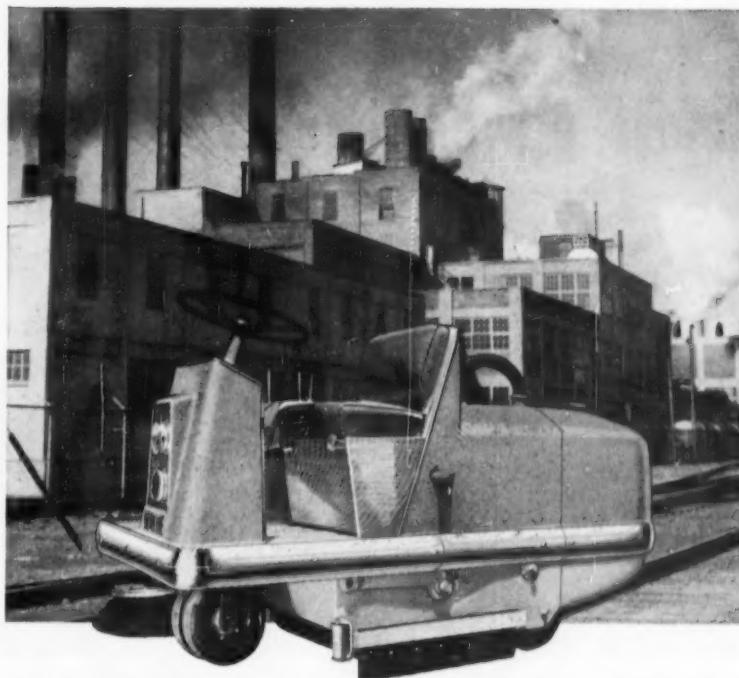
Supply Co., Inc., Buffalo; Dabney-Hoover Supply Co., Inc., Memphis; The Harshberger Equipment Co., Portland; Eastern Engineering Sales Co., Roxbury, Mass.; Stephens-Adamson Mfg. Co., Los Angeles; Linder, Cox & Company, Lakeland, Fla.; S-A Products Co., San Francisco; Langdon Supply Co., Kansas City; and Strong-Scott Mfg. Co., Minneapolis.

Four new distributors have been appointed by The Buda Division of Allis-Chalmers Manufacturing Company. They include: Fork Truck Incorporated, 4 East Grand Avenue, New Haven, Connecticut; Connell Equipment Company, 2861 Sidney Avenue, Cincinnati, Ohio; Banbury Equipment Company, 295 Saw Mill Run Boulevard, Pittsburgh, Pennsylvania; and Nordic Truck and Equipment Limited, 106 Main Street, South West, Weston, Ontario.

Appointment of Richard Relf as district manager in the Cleveland area has been announced by Gould-National Batteries, Inc. He joined the organization in 1948 and has served in four other Gould districts.

The Ken-Dick Corporation of Moline, Illinois and Des Moines, Iowa, has been appointed to represent the Materials Handling Equipment Division of Union Steel Products Company.

Wayne Shovel and Crane Division of American Steel Dredge Co. Inc., has appointed the following new distributors: Road Machinery Company, Phoenix, Arizona; McCall-



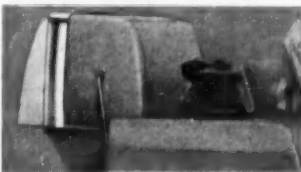
### COMPLETELY NEW, YEARS-AHEAD POWER SWEEPER . . . Engineered to Outlast and Outperform Any Other Sweeper!



"Filter-Vac Dust Control"—NO DUST BAG TO EMPTY. High Velocity fan deposits fine dust into main dirt hopper automatically. (Patent Pending)



"Power-Flex" Action enables Wayne to pick up larger objects or to travel without sweeping.



Power Dumping, hydraulically operated while driver is seated. Disposes of refuse in one quick, simple operation.

Sweeps over 100,000 square feet per hour! Rugged, dependable, economical! Years of experience behind famous Wayne Street Sweepers have gone into the design and development of the new Wayne Power Sweepers.

- Vacuum attachment for cleaning shelves and bins (available for all models).
- Larger hopper capacity.
- L.P. Gas models (available).
- Extra power for greater sweeping capacity and ability to climb steep grades.
- Automotive type steering that affords greater maneuverability.

send for  
further  
information



#### Wayne Manufacturing Co.

1214 E. Lexington Street  
Pomona, California

Please send me literature regarding the new Wayne Power Sweepers.

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



World's Largest Producer of Power  
Sweepers for Cities and Industry

Dealer Inquiries Invited

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SEPTEMBER, 1955

← Circle No. 67 on Reader Service Card



**now!**  
more power than ever



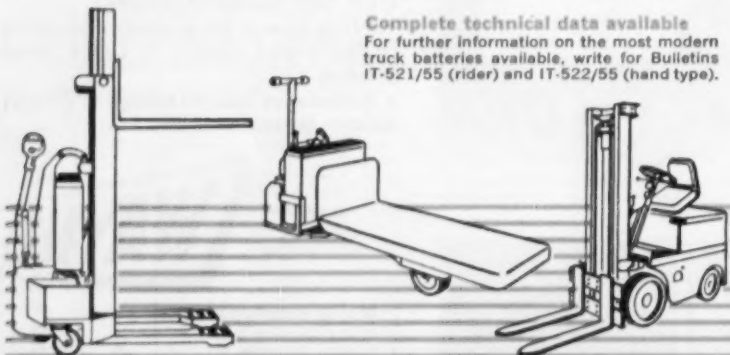
with C&D's new **66** and **125**  
Industrial truck batteries

Ten years ago C&D pioneered two high capacity batteries—and the users of these batteries today represent a bluebook of American industry.

Now, after continuing research, development and testing, the newest additions to C & D's line of industrial truck batteries, the 66 and 125 are available. Now you can get at least 10% more capacity in standard size trays for your truck. *In truck operation, this means at least a 10% longer duty cycle.* Now, you can put the most modern maximum capacity industrial truck battery on the market today—C & D's Five-Fold Silyver-Clad\* to work in your trucks. Remember—C & D Silyver-Clad Batteries move more tons—for longer periods!

\*T.M. Reg.

Complete technical data available  
For further information on the most modern  
truck batteries available, write for Bulletins  
IT-521/55 (rider) and IT-522/55 (hand type).



**C&D BATTERIES, INC.**  
*of Conshohocken, Pa.*  
Industrial Batteries Since 1906  
Sales and Service Offices in Principal Cities from Coast to Coast

Circle No. 39 on Reader Service Card for more information

**SALES FIELD**

*Continued*

Gardner Co., Houston, Texas;  
Vermont Road Equipment Co.,  
Inc., Montpelier, Vermont; and  
Service Equipment Company,  
North Miami Beach, Florida.

Low Webster, industrial engineer, has joined the sales engineering staff of M. E. Canfield Company, southern California material handling distributors. A graduate of the University of Southern California, Webster brings to the company an extensive background in industrial engineering with special emphasis on material handling equipment. M. E. Canfield Company is a distributor of Lewis-Shepard Products, Inc.



Low Webster

Special sales engineer for The Cambridge Wire Cloth Company's Gripper Sling Department is J. L. McCandless. In his new capacity, he will work with distributor organizations in foreign markets for the product.

Donald H. Nopson has been named new export field representative for the Hyster Company. He joined the firm in 1950 and since 1952 has been with the export division headquarters in Peoria, Illinois. In his new position, he will cover the Latin American countries of Venezuela and Colombia.

New general sales manager of Dage Television Division of Thompson Products, Inc. is John R. Howland. In his new capacity, he will supervise sales of the firm's television systems

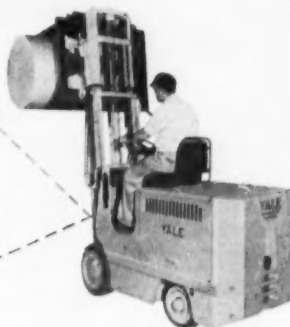




## HOW MANY TRUCKS HERE?



YALE Electric Truck with basic forks performs a host of routine handling jobs like this.



Revolving attachment on same YALE Electric Truck handles huge paper rolls or drums with ease, stacks them flat or up-ended.



Clamping attachment simplifies handling of large, bulky units or fragile containers. There are other YALE attachments for handling any type material.



## ONE! A SINGLE YALE TRUCK DOES THESE 3 JOBS AND MORE

Take a YALE Truck...add interchangeable YALE attachments...and you can handle a variety of lifting, stacking and moving jobs every day! What's more, you'll handle them faster, safer and at less cost. Job-specified YALE attachments—installed in minutes, removed as easily—perform dozens of specialized handling jobs...are designed for use with every Truck in the

complete YALE line.

Thus, you may select just the equipment you require for your operations from the world's widest range of Electric Trucks; Gas, Diesel and LP-Gas Trucks and use-extending attachments. For full information about these dependable, economical, longer-lasting industrial tools, send coupon today!

# YALE<sup>\*</sup> INDUSTRIAL LIFT TRUCKS AND HOISTS

\*REG. U. S. PAT. OFF.

Gas, Electric, Diesel & LP-Gas Industrial Trucks • Worksavers  
Warehouses • Hand Trucks • Hand & Electric Hoists

### MAIL THIS COUPON TODAY

The **YALE & TOWNE** Manufacturing Co., Dept. 49  
Roosevelt Boulevard, Philadelphia 15, Penna.

- ☐ Please have your local representative call.  
☐ Please send me further information on YALE Trucks and attachments.

Company \_\_\_\_\_

Name \_\_\_\_\_ Title \_\_\_\_\_

Street \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_

In Canada write: The Yale & Towne Manufacturing Co.  
St. Catharines, Ontario, Canada

Circle No. 189 on Reader Service Card for more information



The technique of material handling is a science of saving by increased efficiency. COLES first of all, offer savings by mechanical handling of heavy loads over large areas. They offer you savings over and above clutch operated cranes by making low cost maintenance a reality, and by reducing gasoline consumption by as much as 60%. Of equal importance is the saving in aisle width, a saving that is only possible by using a COLES cantilever type boom, combined with the shortest tailswing of any full-circle swinging crane. No other crane could stand so near to the stack of lumber in the illustration and

still work effectively. The cube in your yard is free and can be used effectively with a COLES CRANE.

With COLES even the heavy or awkward load can be positioned with hair-line accuracy — gently, where you want it. That kind of maneuverability is possible — only with gas or diesel electric transmission — a feature of every COLES Crane. There is a size or capacity to fit your need. The COLES is versatile, in close quarters, will go everywhere and can be easily switched from hook work to magnet, grabbing duties, Etc., to handle all kinds of load.

Write for New Literature.

**COLES CRANES, INC.**  
**BOX 942 F, JOLIET, ILL.**



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## SALES FIELD

*Continued*

throughout the world. Howland has filled important industry posts concerned with such matters as labor, trade practices, tax revision, commercial television and mobile communications. He was a member of the original National Television Systems Committee and directed Chicago's first F-M station.

New southeastern district sales manager of **The Yale & Towne Manufacturing Company's** Hoist Division is **Ellwood S. Moorhead**. He succeeds **George Sherrill**, who resigned after

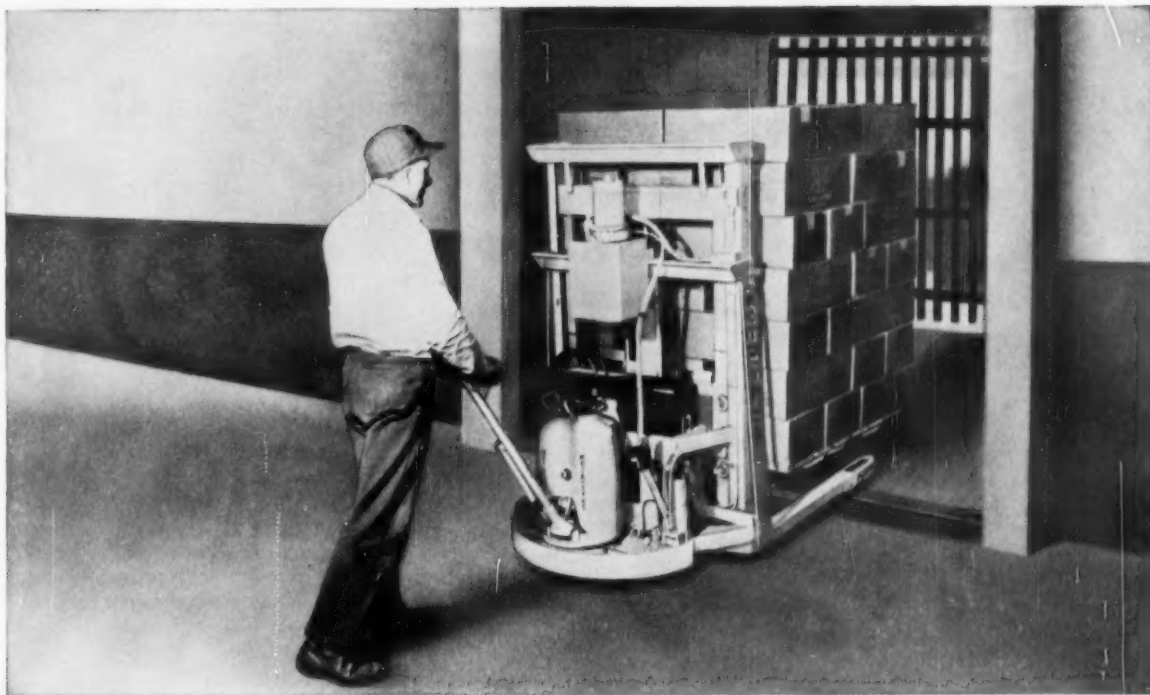


32 years service **E. S. Moorhead** with the company. Moorhead will headquarter in Birmingham, Alabama. He was formerly hoist district manager in the Middle Atlantic area, and his duties there have been assumed by **Theodore Simendinger**, district representative.

Consolidation of all its operations in one large plant covering two acres has been announced by **Geo. M. Prescott Co.** The new facility is located at 825 South Fremont Avenue, Alhambra, California.

**Robert C. Herrmann** has been named western factory representative of **Brooks Equipment & Mfg. Co.**, a subsidiary of Borg-Warner Corp.

**Arrow Products, Inc.** has appointed **Cascade Handling Equipment Company** its distributor for the state of Washington. The firm is located at 410 Battery Street, Seattle.



## ON THE ELEVATOR... *with* FREIGHT CAPACITY to Spare!

Excessive re-handling of loads because of limited elevator capacities is often completely eliminated with Moto-Trucs. The light, yet powerful compactness of a Moto-Truc lets you move load and truck into an elevator with weight capacity to spare.

The complete line of Moto-Trucs are designed and built for economical, space saving operation. Inch for inch . . . pound for pound . . . Moto-Trucs are the smallest, yet the most powerful walkie trucks in the world.

Write for Bulletin No. 53 . . . It covers the complete Moto-Truc line.



**The MOTO-TRUC Co**

Representatives in Principal Cities

1955 E. 59th St. • Cleveland 3, Ohio

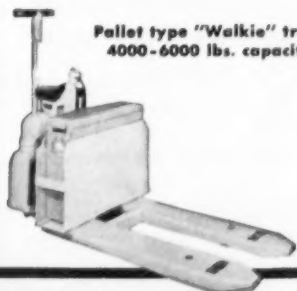
Pallet . . . Platform . . . Hi-Lift Trucks  
The Originators of the Walkie and  
Small Rider Type Truck.

Hi-lift "Walkie" type  
3000-4000 lbs. capacity

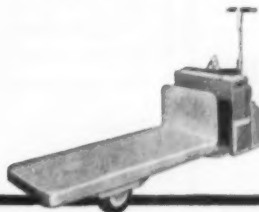


*a MOTO-TRUC for every purpose...*

Pallet type "Walkie" truck  
4000-6000 lbs. capacity



Platform "Walkie" type  
4,000-10,000 lbs. capacity



Grip-All Tractor



Circle No. 125 on Reader Service Card for more information



**Whenever You Buy—Specify—Engineer**

**YOU WILL USE THIS MASTER  
CATALOG OF THE MATERIAL  
HANDLING INDUSTRY...**

The 1956-57 FLOW DIRECTORY — 5th biennial issue — completely brought up to date, includes new data and a brand new, separate, complete section on equipment used in Packaging and Shipping. The only volume in the Material Handling field, its engineering, lists of manufacturers, and manufacturers' catalog and specification sheets makes this the volume you will reach for whenever you buy, specify or engineer Material Handling and Packaging Equipment and supplies.

*Divided for practical every day use into these sections:*

**EQUIPMENT & MANUFACTURERS.** A complete, illustrated, alphabetical manufacturers' listing, including descriptions and illustrations of all types of material handling machinery and equipment.

**TRADE NAME INDEX.** An alphabetical listing of trade names, the product of products they identify — tied to the names of the manufacturer.

**ENGINEERING & TECHNICAL DATA.** Tables, charts, graphs, and other pertinent technical data that have been collated for use by the engineers in the material handling field. This section is augmented by newly developed material.

**MANUFACTURERS' CATALOGS & OUTLETS.** Catalogs of equipment manufacturers in this field in alphabetical order, together with listing of their local outlets.

**THE INDUSTRIAL PACKAGING & SHIPPING MACHINERY SECTION ABSOLUTELY NEW, COMPLETELY DIFFERENT.** All material, technical guides, data and information pertinent to this field, along with manufacturers' catalog material, will be included in this section. This is a "first" — and has been developed at the insistent requests of thousands of users of the FLOW DIRECTORY.

**WHERE TO BUY OR RENT MATERIAL HANDLING EQUIPMENT.** A geographic listing of independent, local outlets throughout the United States and Canada. These "yellow pages" of the FLOW DIRECTORY have been brought completely up to date.

**flow DIRECTORY**

**MASTER CATALOG  
OF THE  
Material Handling  
Industry**

**FLOW DIRECTORY**

1240 ONTARIO STREET • CLEVELAND 13, OHIO

Send me ( ) copy(ies) of the 1956-57 FLOW DIRECTORY as soon as it is available.

Check enclosed ( ) Bill me ( )

Bill my company (Order No. )

Please make checks payable to FLOW DIRECTORY, Ohio sales • add 3%

Name .....

Company .....

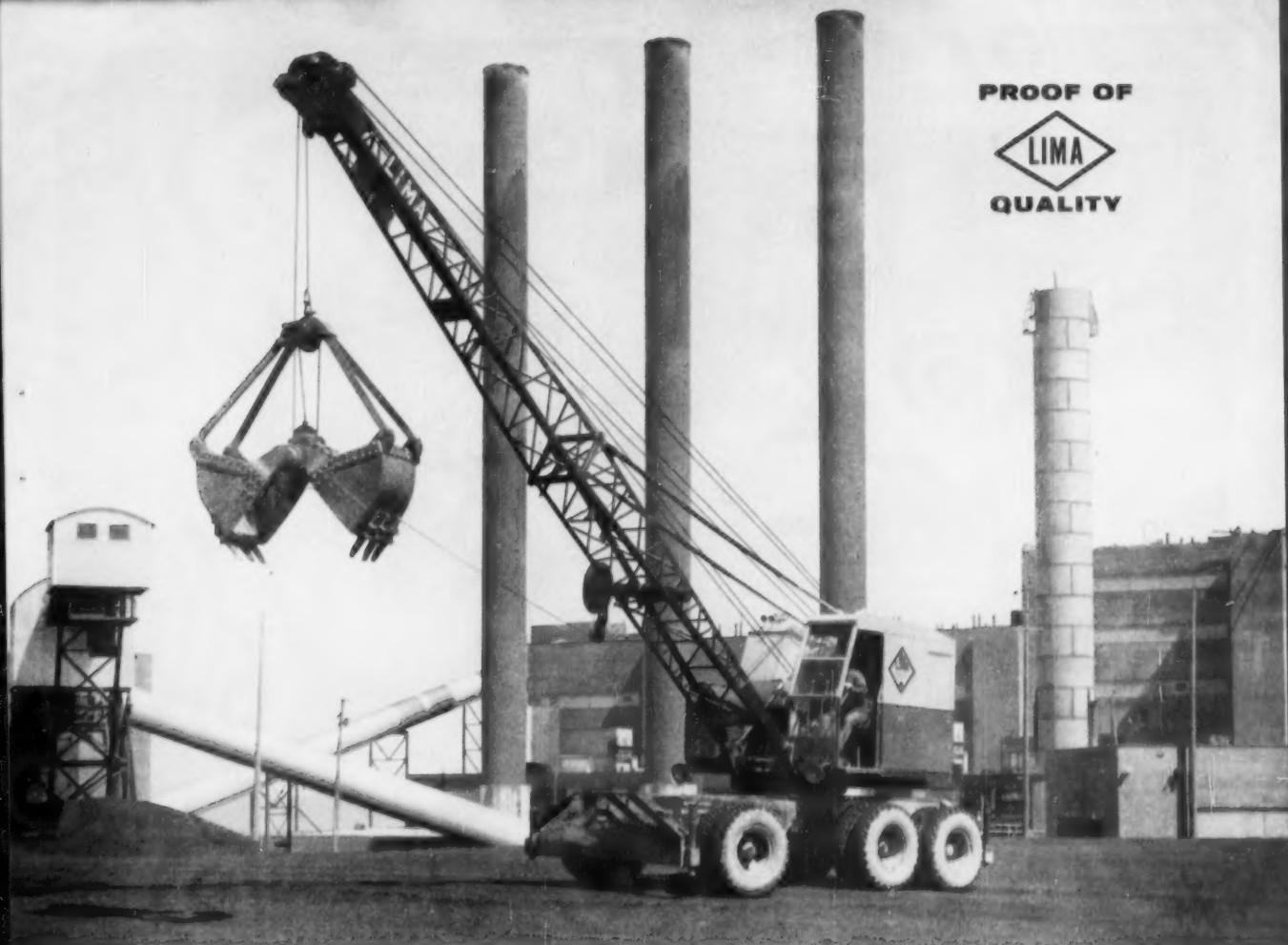
City ..... State .....

**Ready  
January 1956**

**ORDER YOUR  
COPY TODAY**

**\$6.50**





PROOF OF



QUALITY

The Cleveland Electric Illuminating Company's Lima is shown working on the reserve coal pile at Eastlake. One of the world's most efficient plants,

Eastlake produces power for only  $\frac{1}{4}$  lb. of coal per kw. Completion of a fourth generator (right, above) will up plant capacity to 660,000 kw.

## The Cleveland Electric Illuminating Company finds wagon mounted LIMA excellent for outside materials handling!

The Cleveland Electric Illuminating Company has used a wagon mounted Lima Type 34 for outside materials handling at its Eastlake Power Plant for four years. They've found this quality-built Lima to be an excellent performer and have used it on a variety of jobs. They report:

"Our wagon mounted Lima is really mobile. We can move it quickly to any part of the plant where it's needed. In general materials handling work, it gives us smooth, fast lifts of all weights within its capacity. Simple, handy controls make the machine easy to operate, too.

"The Lima's ability to perform a wide variety of digging and lifting jobs is another big asset. By interchanging clamshell and hook on the boom, we've been able to use it for general construction work during

building of the Eastlake plant . . . coal handling . . . stock materials handling . . . laying tracks and ties for rail spurs . . . moving steel used in high wire work . . . and many other jobs. We've even used it to right trucks that have tipped over on our coal pile.

"In the four years our Lima has been at work, we've had no major maintenance downtime with it. Performance has been excellent."

Whatever *your* materials handling needs may be, it will pay you to check the complete line of wagon, truck or crawler mounted Limas . . . designed and built with the emphasis on quality to give *you* perfect performance on every job. See your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD



**LIMA** SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

**BALDWIN-LIMA-HAMILTON**

Construction Equipment Division • LIMA • OHIO • U. S. A.

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## Here's **MASS-HANDLING** of bulk

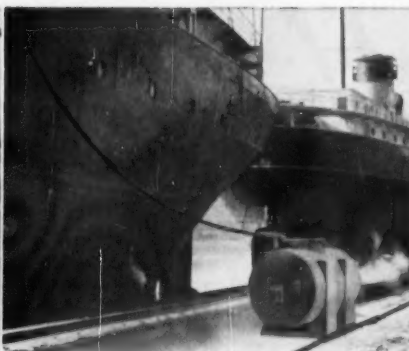
What you see above is a Dempster-Dumpster serving one of its detachable containers. Multiply this simple pick up, haul and dump operation by scores of steel containers built to meet your requirements for handling waste or salvable materials, raw and finished products, fluids including acids, combustibles, dusty materials, etc. You have, then, mass-handling of bulk materials with one truck and one man!



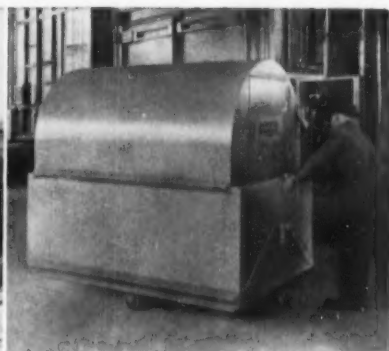
**DEMPSTER BROTHERS**



Tilt Type Container is handling filter dirt at a plant in Illinois. Note container is equipped with casters and placed under chute, through which the filter dirt passes directly from presses. As each container is filled, it is replaced with an empty one.



Tank Type Container is being filled with used oil from a ship. Time required to haul loaded container to reclaim station, drain and return for refilling—10 minutes. Time cycle of the former method using conventional barrels—60 minutes.

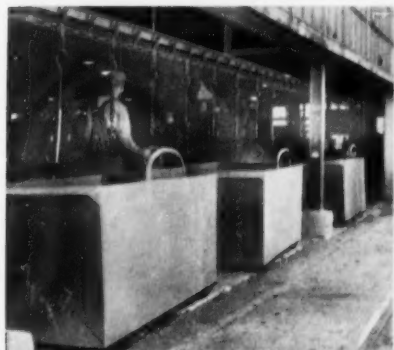


A loaded Apartment Type Container, equipped with roller bearing casters, is being rolled to outside of this plant building. Dempster-Dumpster will pick it up, haul to disposal area, dump the refuse and return empty container for refilling.

Three heavy duty Drop Bottom Type Containers, shown below, are loaded with cast iron fittings from conveyor at plant in Birmingham. Dempster-Dumpster picks up each container when loaded and hauls the finished products to shipping department.

Here's another example of the many types of waste materials handled by this system. The Skip Type Container shown below is located under hydropulper at a paper plant. Picture was shot while container was being filled with rope waste sludge.

Waste materials are loaded into these Universal Containers at a food plant warehouse. Containers have lids in top, as well as a door in each end, which are opened to make deposits, then closed, sealing materials in container.



## materials with one truck...one man!

A FEW OF THE HUNDREDS of containers available are shown above in actual service. They are built in capacities up to 21 cu. yds.—several times the capacity of the average dump truck body. One Dempster-Dumpster, operated by only one man, the driver, serves scores of big detachable containers, one after another—handling materials of every description. It's like having one truck with scores of bodies!

Records of performance in dozens of installations prove beyond question that savings are tremendous! The Dempster-Dumpster System cuts costs of equipment and operation. It is common knowledge that one Dempster-Dumpster will perform the work of several conventional trucks, reducing investment ac-

cordingly. This system eliminates standing idle time and re-handling of materials. Once placed in these containers, materials remain there until hauled to destination. Efficiency, sanitation and good plantkeeping are big advantages. Materials to be transferred or disposed of are constantly being placed in the containers as they accumulate. Containers for handling refuse are fire-proof, rat-proof and scavenger proof.

With no obligation on your part, our engineers will be glad to make a comprehensive fact-finding survey to determine the cost-cutting possibilities of this equipment in your plant. Write us for complete information today! Manufactured exclusively by Dempster Brothers, Inc.

**695 Shea Building, Knoxville 17, Tennessee**

SEPTEMBER, 1955

47



Ackermann BAND-BOX gives full protection to contents in storage and in transit.

*New!*

**ACKERMANN**  
**BAND-BOX**  
PATENT APPLIED FOR  
**SHIPPING CONTAINER**

**Re-usable, Steel  
Shipping Container**

**SHIPS  
STACKS  
STORES  
BANDS  
NESTS  
PALLETIZES**

*easily, efficiently, economically!*

Here's the practical solution to your inter-plant shipping and storage problems...the new Ackermann BAND-BOX. Feature for feature, there's just no other shipping container that can compare to it.

Light weight but rugged. Space necessary for storage when not in use is greatly reduced. No repair expense because spare parts are less expensive than labor. Engineered to your exact needs. Write, wire or call today.

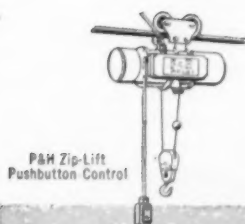


**ACKERMANN MANUFACTURING COMPANY**

WHEELING • WEST VIRGINIA

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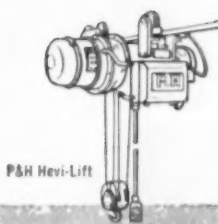




P&H Zip-Lift  
Pushbutton Control



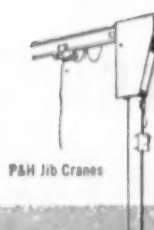
P&H Hevi-Lift  
Special



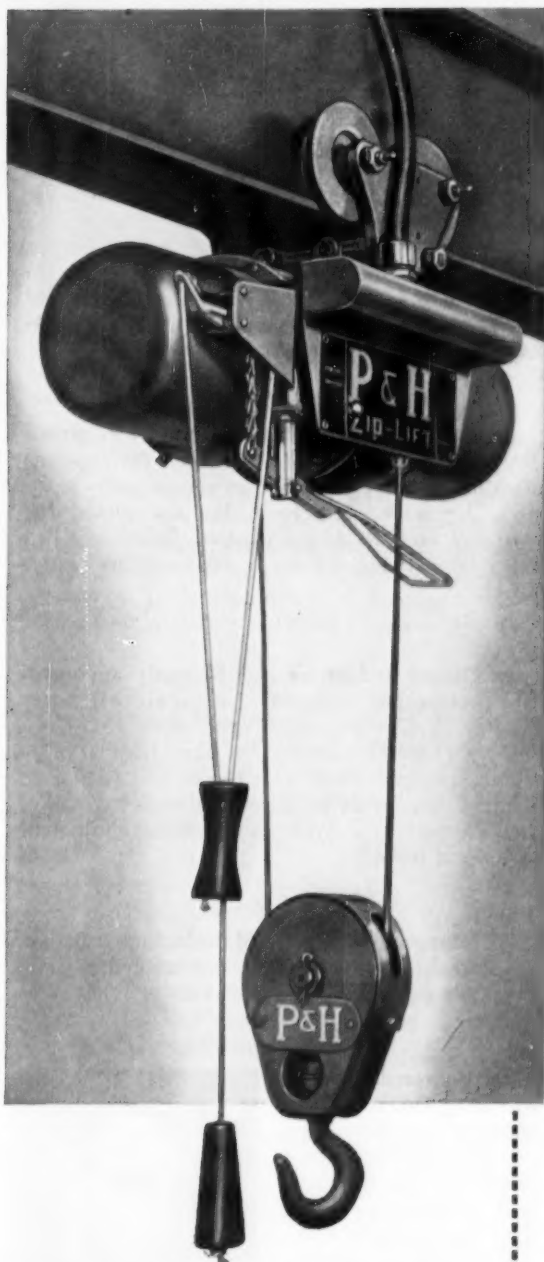
P&H Hevi-Lift



P&H Hand  
Chain Hoists



P&H Jib Cranes



## Your own good judgment will sell you

... on the hard-working,  
dependable advantages of a  
**P&H** Zip-Lift Special Hoist

There's one easy way we know to convert you from prospect into customer. Simply take the following factual statements and compare them with what competing brands of hoists offer you:

The P&H Zip-Lift Special is a rope-controlled, *wire-rope hoist* — yet it sells at electric chain hoist prices.

It has a safety factor of *five!*

The Zip-Lift Special is fully enclosed and weather-proofed. It has a lifetime-lubricated, ball-bearing, full-capacity motor.

The new drop-forged block is only one symbol of the famous P&H quality built into every Zip-Lift.

Now, check the advantages of competing hoists against this list. Then use the coupon below for complete information on this newest member of the P&H Hoist line. P&H Hoist Division, Harnischfeger Corporation, 4643 West National Avenue, Milwaukee 46, Wisconsin.

*Tear out this coupon and mail today!*

P&H HOIST DIVISION, HARNISCHFEGER CORPORATION 3032

4643 West National Avenue, Milwaukee 46, Wisconsin

Gentlemen:

Please send me the illustrated booklet, including specifications, on the new P&H Zip-Lift Special Hoist.

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

TITLE \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

ZONE \_\_\_\_\_

STATE \_\_\_\_\_

**HARNISCHFEGER**

*the* **P&H** *Line*



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SEPTEMBER, 1955

# MEN in the NEWS



H. F. Vickers



K. R. Herman



N. E. Edlefsen

At **Vickers Incorporated** . . . New officers elected by the board of directors are **Harry F. Vickers**, vice chairman of the board; **Kenneth R. Herman**, president; and **Dr. N. E. Edlefsen**, vice president, engineering. The new vice president of the board is the company's founder. He also is president of **Sperry-Rand Corporation**, of which Vickers is a subsidiary. Herman, vice president of Sperry-Rand, joined Vickers in 1931. He previously was vice president and general manager of Vickers. Dr. Edlefsen was formerly associated with **North American Aviation, Inc.**; is a graduate of **Utah State College** and holds degrees from the **University of California**.

At **B. F. Goodrich**. . . Prominent **Cleveland**, **Elmer L. Lindseth**, was elected to the board of directors. He is president of **The Cleveland Electric Illuminating Company**, and also serves on the board of several other companies. He is a member of the **National Industrial Conference Board**.

At **The Chas. Wm. Doepke Mfg. Co., Inc.** . . . President **C. W. Doepke** and Vice President **W. C. Portman** accepted the two millionth **Nes-Tier** box from Plant Manager **William Christoffel** recently, four years and one month after the first unit was manufactured.

At **Fab-Weld Corporation**. . . **George J. Hanhauser** succeeded **Frank W. Bruckerl** as president and **Robert F. Bole** was elected executive vice president. Bruckerl will continue to serve on the board of directors.

At **U. S. Rubber Company**. . . Executive Vice President **H. Gordon Smith** has been elected vice chairman of the board and chairman of the executive committee, and Vice President **Chester J. Noonan** has been elected a member of the executive committee. **G. Allen Lovell**, who joined the company in 1918 as an apprentice, has been elected a vice president and appointed general manager of the mechanical goods division. **Herbert J. Reid** will serve as Lovell's assistant.

At **Gar Wood Industries, Inc.** . . . Vice President **Milton G. Peck** has announced the appointment of **Harold H. Hippler** as general sales manager. A native of **Detroit**, Hippler joined the company in 1924, and since that time has filled many important positions in the company's sales activity.

At **Dickey Industries** . . . Recently appointed vice president is **Arthur H. Luchs**. He will headquarter in **San Francisco**, and have charge of sales in 11 western states. For more than 20 years Luchs was associated with the **Round California Chain Company** in an executive capacity, and is well known to the west coast hoisting equipment and chain trade.

At **Minnesota Mining & Manufacturing Co.** . . . **Richard L. Sheppard** has been named general sales manager of the cellophane tape division.

At **Bosworth Manufacturing Co.** . . . **Glen Mooney** has been appointed to the presidency of this standard and custom-engineered conveyor systems manufacturer in **Avon, Ohio**. He comes to the company directly from **Truscon Laboratories, Detroit**, where he was general sales manager.



Glen Mooney

At J. N. Fauver Company, Inc. . . . John Newton Fauver, president, died July 6. Prior to founding the Fauver Company 32 years ago, he was a distributor of automotive equipment, and at one time was sales manager of White Star Refining Company.



**Jerome L. Huff**  
of the Mandeville & King Co., his new duties with Hartman include full responsibilities in sales management and promotion.

At Hartman Metal Fabricators Inc. . . . Appointment of **Jerome L. Huff** as sales manager has been announced. He is a graduate of Hamilton College and holds a masters degree in business administration from Harvard Business School. Formerly assistant sales manager

At Globe Hoist Co. . . . New vice president in charge of engineering and manufacturing operations is **Frank Breckenridge**, who will also serve on the board of directors. Breckenridge will headquarter in Philadelphia, but will spend portions of his time at all three Globe plants.

At Koehring Company. . . . **M. O. Messenger** has become vice president and general sales manager of Koehring-Waterous, Ltd. in Brantford, Ontario. He has been associated with Koehring in various capacities for more than 16 years.

At Brainard Steel Division. . . . New plant manager of the Larchmont Avenue plant in Warren, Ohio is **John M. Magde**, who formerly managed the Griswold Street plant. He is a graduate of the University of Illinois where he specialized in industrial engineering.

At Hyster Co. . . . Vice President and General Manager **Eugene Caldwell** left on August 3 for a five-week management consulting tour of Chile under auspices of the Foreign Operation Administration of the Department of State. He was selected to lead management discussions on industrial organization and financial management by the Council for International Progress in Management, which supplies F.O.A. consultants. Purpose of the program is to provide Chilean management personnel with information on American business methods.

## YOU CAN **DEPEND** ON **HAMILTON CASTERS!**

### AIR-FLO STEEL CASTERS

Semi-Steel, Molded Plastic or Rubber-Tired Wheels Up to 2500 lbs. capacity per caster!



**Designed for Smoother, Easier Rolling!**

**Engineered for the Job!**

**Built for Dependable, Rugged Service!**

For rugged, heavy-duty service and smooth, trouble-free performance you can depend on Hamilton casters. They're built to take it—no job is too tough for them. One of America's most complete lines, Hamilton offers hundreds of types and sizes of casters for industrial applications. These include swivel and rigid models in forged steel, plate steel, semi-steel and pressed steel, with a wide choice of wheels—rubber-tired, molded plastic, semi-steel, etc.

Specify Hamilton—and you get the best at the right price. Tell us your caster requirements, and how many you're interested in. We'll send a prompt quotation.



**No. R-RD-S  
RIGID PLATE  
STEEL CASTER**  
Up to 600 lbs.  
capacity per caster.

## HAMILTON WHEELS FOR EVERY REQUIREMENT



**MOLDED-ON  
RUBBER-TIRED WHEELS**



**SEMI-STEEL  
WHEELS**

Hamilton industrial wheels are available in hundreds of types and sizes—semi-steel, molded plastic, pneumatic, semi-pneumatic and molded-on rubber-tired, etc. Hamilton offers an exceptionally complete line of industrial wheels and casters. Tell us your requirements!

### COMPLETE CATALOG FOR YOUR FILES!

The Hamilton Caster & Mfg. Co.  
1672 Dixie Highway, Hamilton, Ohio

Please Send Me My Hamilton Caster and Wheel Catalog.

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COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_



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**PUSH-BUTTON PENDANT  
OR CABLE CONTROL**

*There's a speedy dependable*

# ARO

## **PRODUCTION AIR HOIST to fit your job!**

**2,000 lb.  
1,500 lb.  
1,000 lb.  
500 lb.  
300 lb.  
100 lb.**

**VARIABLE SPEED** . . . 1000 lbs., 0 to 38' per minute . . . 2000 lbs., 0 to 20' per minute . . . load can be inched or zipped.

**AIR-POWERED FOR SAFETY** . . . no spark hazard . . . explosion-proof motor . . . can't burn out . . . can't overheat . . . unaffected by dust or fumes.

**LIGHTWEIGHT** . . . only 28½ lbs. for 1000 lb. hoist . . . 2000 lb. hoist weighs only 47 lbs. Overall length all models, 10½" to 11½".

### **TRY THIS WITH ANY OTHER HOIST!**

You can inch so slowly that you can touch an egg without breaking it!



# ARO

## **AIR HOIST**

Also . . . Air Tools . . . Lubricating Equipment . . .  
Aircraft Products . . . Grease Fittings

**SEE YOUR ARO DISTRIBUTOR  
THE ARO EQUIPMENT CORPORATION**

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Aro Equipment of California, Los Angeles, Calif.

Aro Equipment of Canada, Ltd., Toronto 15, Ontario

Offices in All Principal Cities

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**ALLIS-  
CHALMERS**  
(BUDA)

**DISTRIBUTION POINTS  
BLANKET THE FREE WORLD  
THERE'S ONE NEAR YOU!**



Buda Division distributors are literally everywhere. No matter where you go, you'll find convenient delivery, parts in stock, quick servicing by factory-trained mechanics. No matter where your plants are located, you can be sure of fast attention to your problems. So go Buda . . . get the best and expect the most!

**Seeing is believing . . . Free facts book**

Put yourself behind the wheel of a Buda, tear it down, look over the complete line of models to choose from. New book gives complete information! Write for it . . . and the names of Buda Distributors where you have plants.

*Buda Division, Harvey, Illinois*



**ALLIS-CHALMERS**



FORK LIFT TRUCKS



INDUSTRIAL TRACTORS



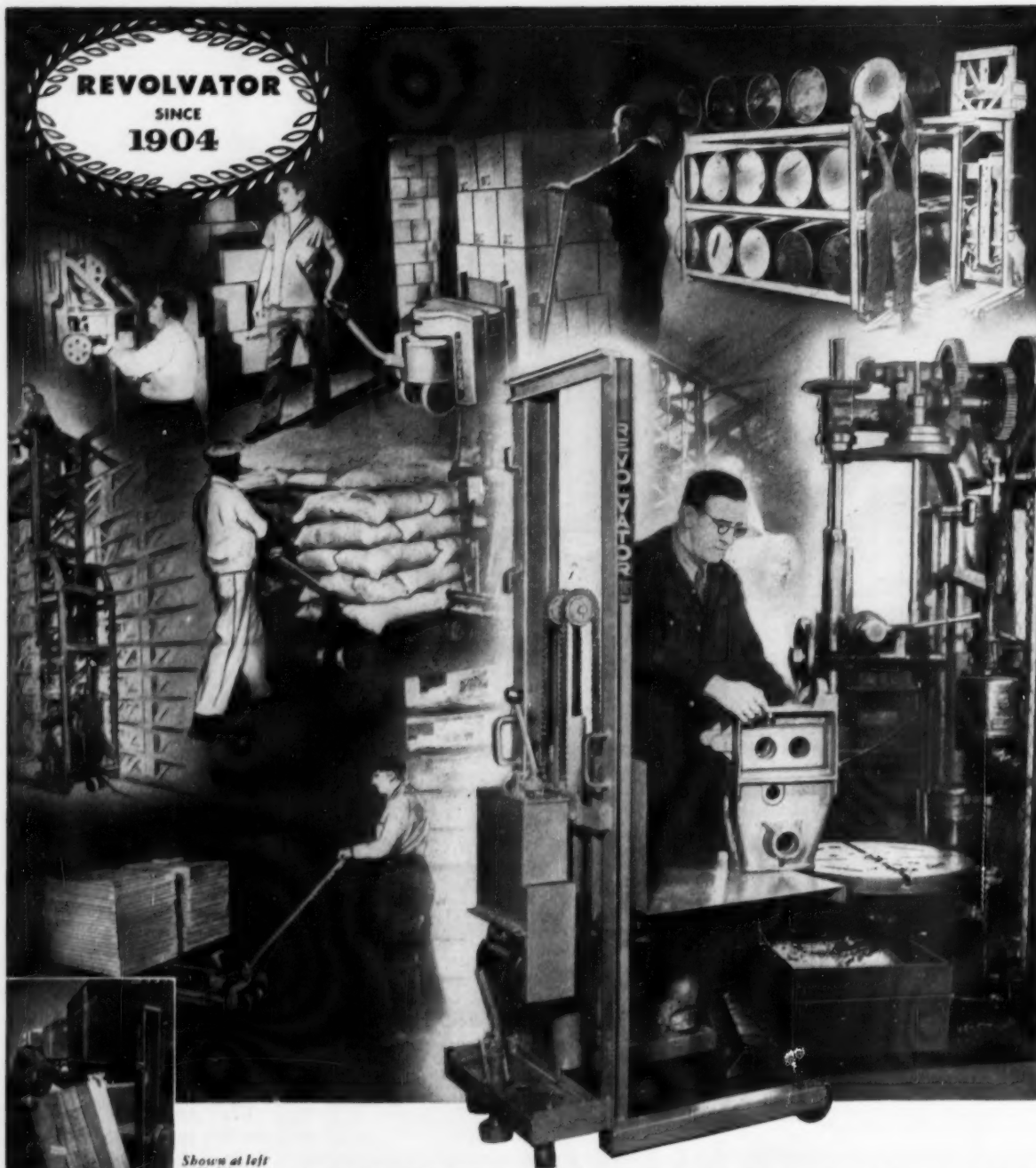
PLATFORM TRUCKS

SEPTEMBER, 1955

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**REVOLVATOR**

SINCE  
**1904**



Shown at left  
is Uplifter  
loading high  
way truck.

## REVOLVATOR UPLIFTER PORTABLE ELEVATORS you benefit by over 50 years of experience

Multiple use, multiple purpose Revolvator Uplifters, products of 50 years of engineering know-how, solve handling problems throughout all industry. Ideal for shop usage, Revolvator Uplifters also speed handling in the shipping department with equal efficiency. The Uplifter is ideal when no shipping dock is available. Electrically-powered Uplifter portable elevators are available in either "plug-in" or battery operated models. Platform and load are lifted by means of a

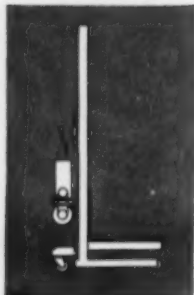
highly efficient motor-driven pump, activating a hydraulic ram and two roller chains, guaranteeing safety and ease of operation. Zee bar construction in uprights assures no sway, no binding of the rollers. Today write for full information.

**REVOLVATOR CO.**

8739 TONNELE AVE., NORTH BERGEN, N. J.

\*Also available in dual capacity hand-operated models.

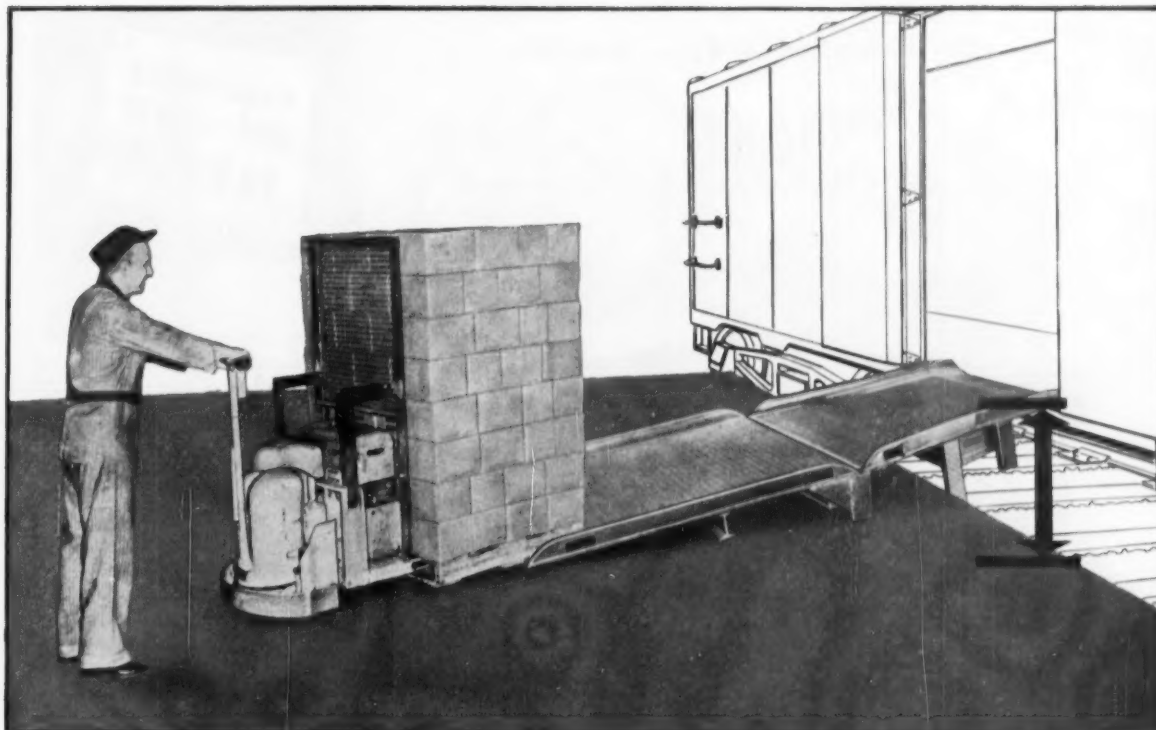
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**Revolvator  
Uplifters:**

1000 lb. capacity — platform length 24", platform width 24", lift 62".

2000 lb. capacity — platform length 30", platform width 30", lift 65".



Magcoa Ramp-Dockboard with angle curbing solves two vexing reefer car loading problems: height differential and narrow door-opening.

## Solve low-rail-dock and narrow-door problems with Magcoa Magnesium Ramp-Dockboards

You know this problem: What to do when your dock is considerably lower than the floor of certain railroad cars, especially refrigerator cars? It's a common problem.

Your local Magcoa Representative can help you solve it by furnishing a Ramp-Dockboard Combination which converts the height difference into a long, smooth grade. No chance for even low-under-clearance pallet trucks to get stuck.

Each section—the Ramp and the Dockboard—can be moved and positioned by one man. A long, one-piece board would have been difficult to handle. A short unit would have resulted in too steep a grade, with resulting underclearance problems. This way—the Magcoa way—your low-dock, high-car loading problem is solved easily . . . and safely.

When the height difference is less than the height of the Ramp, the Dockboard can be used alone.

**Solves The Narrow-Door Problem, Too**—This, too, used to be a major problem: how to get a low-lift pallet truck with a maximum-width pallet load through the narrow door-opening of a refrigerator car. (See Fig. 1). The low-lift trucks could not raise the pallets high enough to clear the quarter-round safety curbs. Magcoa solves the problem by using angle curbing at the car-end of the Dock-



Fig. 1



Fig. 2

board. (See Fig. 2). This satisfies both the underclearance and side-clearance requirements; permits maximum safe use of the refrigerator car door opening. Exclusive Magcoa quarter-round safety curbing is used for the balance of the curb.

**Light-weight, Heavy-duty Magnesium**—Every Magcoa Dockboard is constructed of magnesium, the lightest of structural metals. Every Magcoa Dockboard has the patented hand holds and other safety features which have made Magcoa Dockboards famous.

**Other Loading Problems?** As illustrated by the case above, it's standard procedure for Magcoa Representatives to approach the *whole* problem . . . and to help you get equipment which solves the *whole* problem, not merely one part of it.

**What's Your Loading Problem?** Are you bothered by a low rail dock? A low truck dock? A narrow, congested dock? Inefficient loading from

ground level? Spilling or damaging loads? Planning the dock for a new plant or warehouse? Modernizing an old dock? Switching to higher-capacity lift trucks or pallet trucks?

Whatever the loading problem, the odds are 1000 to 1 that your local Magcoa Representative has encountered it and solved it before.

**A Suggestion:** Send for our free new bulletin, "What to do about Difficult Docks." It's loaded with practical, helpful ideas.

### MAGNESIUM COMPANY OF AMERICA

MATERIALS HANDLING DIV.  
EAST CHICAGO 1, INDIANA

Representatives in principal cities

IN CANADA—Magcoa Limited,  
277 Kipling Ave. South  
Toronto 14, Ontario

**magcoa**

☐ Please send "Difficult Docks" bulletin

Name and Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City-Zone-State \_\_\_\_\_

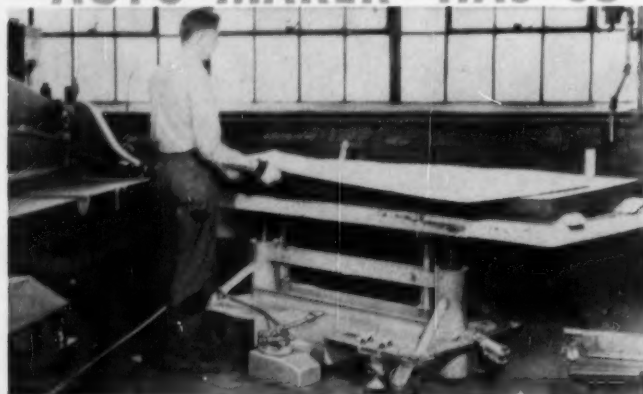
Copyright, 1955, Magnesium Company of America.

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First 3 installed in '49 - - now this

## AUTO MAKER\* HAS 65



**RAYMOND**

*Hydraulic*

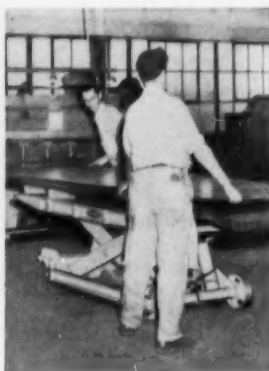
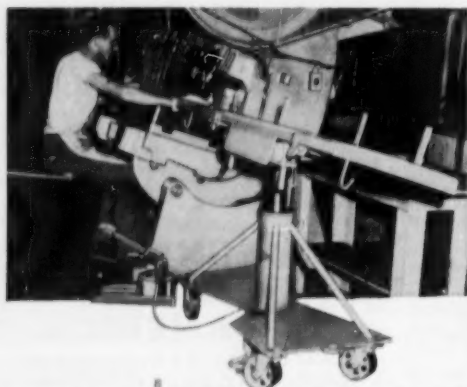
### SHEET FEEDING TABLES

Each year—since 1949—a leading automotive manufacturer has ordered RAYMOND Sheet Feeding Tables. Today, this firm employs 65 RAYMOND Tables.

● There must be a reason when a customer consistently re-orders—and there is. Because RAYMOND Sheet Feeding Tables in-

crease production, reduce hazards, improve plant house-keeping. Lifting by hand is eliminated; work fatigue, is reduced.

● With RAYMOND Tables, thick bundles of sheet metal are elevated hydraulically to proper working height. Workers simply slide sheets onto the press, shear or brake. Lifting mechanisms raise from 18" to 36". Tables are highly portable. Available with single-speed foot pump or power-operated unit. Capacity: 2,000 to 20,000 lbs.



#### The RAYMOND CORPORATION

3371 Madison St., Greene, N. Y.

Please send Bulletin describing RAYMOND Hydraulic Sheet Feeding Tables.

NAME \_\_\_\_\_ TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

STREET \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

**Bulletin  
On  
Request!**

\*Name sent on request.

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## association and society NEWS

● Ten years of accomplishment by the Material Handling Institute were summed up recently in a statement by Robert H. Davies, Clark Equipment Company vice president and association president. Among objectives of the group, noted by President Davies, are the promotion of the proper use of handling equipment; compilation, distribution and exchange of helpful information; promotion of standards; improvement of safety methods; and the informing of industry and government of time and cost cuts gained through mechanized movement. Also pointed out by Davies was the group's educational accomplishments.

● For outstanding contributions to the American Material Handling Society, four men were presented Honor Certificates by the national association. Recipients were Clifford C. Whiteford, The Ford Motor Co., Detroit Chapter; Dr. Spencer A. Larsen, director, Materials Management Center, Wayne University, Detroit Chapter; James B. McGinn, American Viscose Corporation, Philadelphia Chapter; and Sears L. Hallett, publisher, Modern Materials Handling, New England Chapter.

● The Industrial Truck Association has appointed the firm of Dix & Eaton, Cleveland, to write a 125 page handbook containing selection, application and procedure data on industrial trucks. The book is expected to be available for distribution shortly after the first of the year.



● **Albert B. Anderson**, vice president and general manager of Nagel-Chase Manufacturing

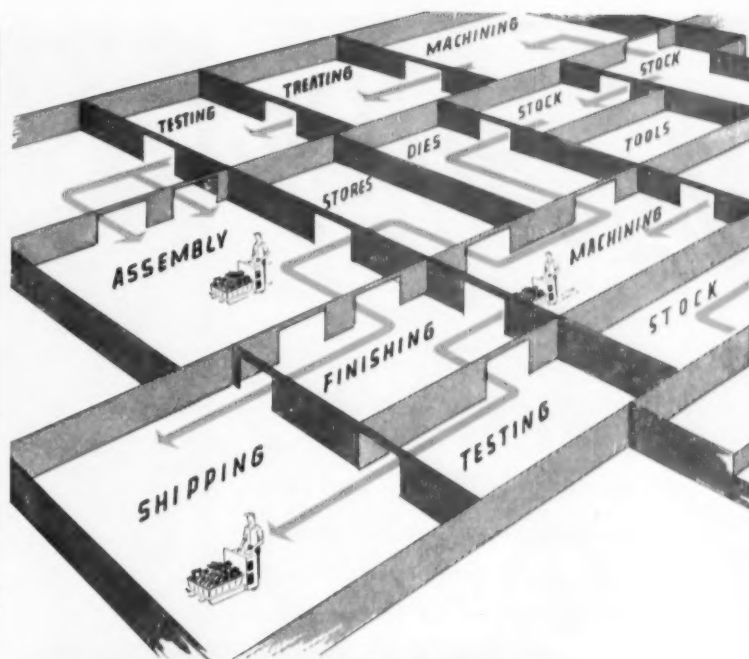


Company and a past president of the Caster and Floor Truck Manufacturers' Association, has been named Chicago's "Man of the Year". Especially recognized for his interest in youth, Anderson was hailed as being "not only a successful business man, but an exemplary citizen who has taken time from his business to perform countless civic services for the good of the community and particularly for the youth of the community."

● **Colonel John B. Day** of Georgia Tech won first prize for the second straight year in the Clark Equipment Company contest sponsored through the American Material Handling Society. Day's paper was entitled "An Engineering Analysis of Narrow Aisles for Materials Handling". John D. Scanlon, Jr. of the Pittsburgh Chapter of AMHS took second prize, and N. E. Richardson, Philadelphia AMHS, third.

● **Kalamazoo Manufacturing Company** has joined The Material Handling Institute, Inc. J. W. Perry, vice president, will be his company's representative.

● Highlight of the 4th annual meeting of the Standards Engineers Society will be the presentation of awards to outstanding engineers who have contributed to the development and use of standards. The meeting will be held in Hartford, Connecticut, September 29-October 1. One of the principal speakers, Dr. C. R. DeCarlo of IBM will have as his subject "Without Standards, No Automation".



## FAST MOVER

**Speeds up handling on long hauls, stock picking, loading, unloading!**

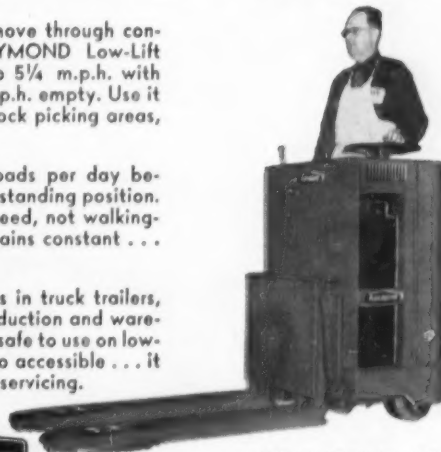
**KEEP MATERIALS** on the move through congested areas with a **RAYMOND Low-Lift Electric Truck**. Travels up to 5 1/4 m.p.h. with 4,000 lb load . . . up to 6 m.p.h. empty. Use it between departments, in stock picking areas, to and from loading docks.

Low-Lift transports more loads per day because operator rides in safe, standing position. Materials move at riding-speed, not walking-speed . . . work output remains constant . . . strain, fatigue are reduced.

So compact . . . it operates in truck trailers, boxcars, elevators, 6 ft. production and warehouse aisles. So light . . . it's safe to use on low-capacity elevators, floors. So accessible . . . it opens up like a book for easy servicing.



### Low-Lift ELECTRIC TRUCK



MODEL EL4F for single and double-face pallets. Capacity: 4,000 lbs. Also available in skid platform model.

Patent No. 2,564,002

#### The RAYMOND CORPORATION

3367 Madison St., Greene, N.Y.

Please send Bulletin 850 on your Low-Lift Electric Truck

**Write for  
Bulletin**

NAME \_\_\_\_\_ TITLE \_\_\_\_\_  
COMPANY \_\_\_\_\_  
STREET \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_

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# Versatility

The versatility of handling illustrated by these action shots, clearly demonstrates the flexibility of design of Youngstown containers. Our engineers can as readily tailor Youngstown containers to fit your needs perfectly.



- ▲ CRANE HANDLING
- ◀ FORK LIFT TRUCK HANDLING
- ➡ MAGNET HANDLING



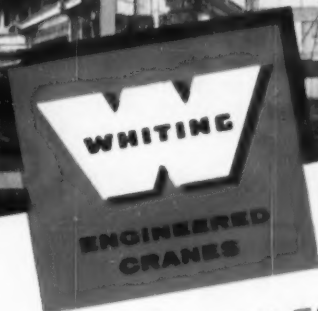
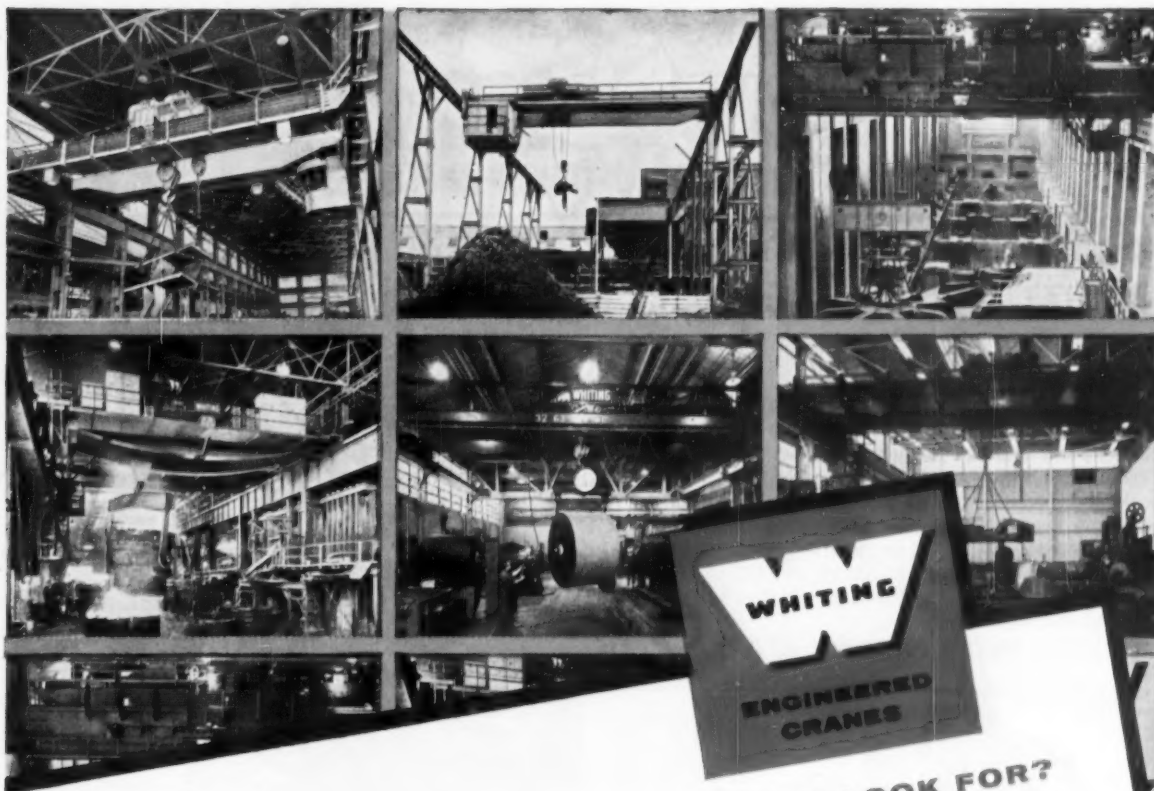
● Consult with us for improved handling of your bulk materials

**THE YOUNGSTOWN STEEL DOOR CO.**

Camel Sales Company • Camel Company Limited

CLEVELAND • CHICAGO • NEW YORK • YOUNGSTOWN

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## In Buying a Crane

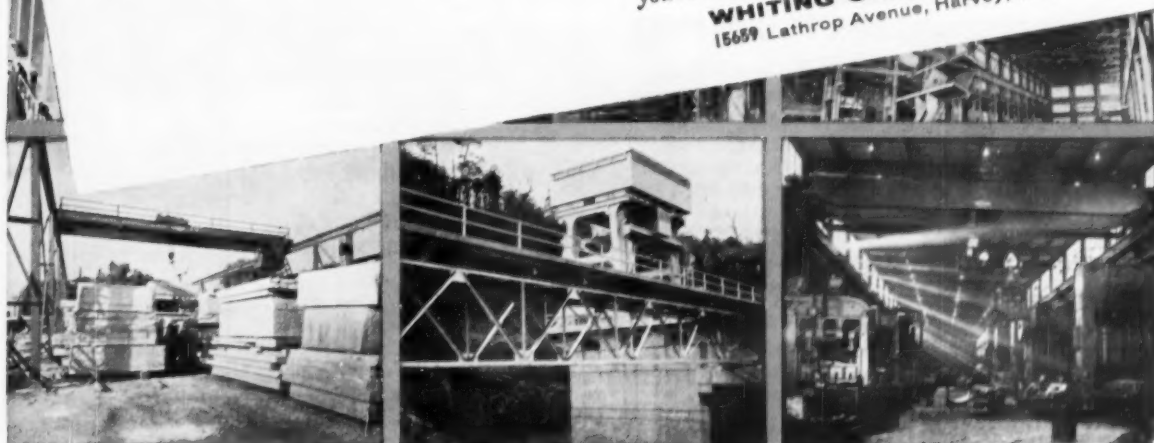
### WHAT DO YOU LOOK FOR?

You look for many things in a crane . . . performance, high quality of parts, outstanding features, a fair price. But how do you *know* you will get them? *Here's how!* Seek the counsel of a manufacturer who has had many years of crane building experience and who can show you outstanding examples of engineering. Talk over your requirements with men who can advise you of recent crane developments and who have helped plan important installations in firms throughout the world. Do business with people who have a reputation to uphold and who accept responsibility *after* as well as during installation.

*Look to Whiting for all of these things. Let us tell you about them now!*

**WHITING CORPORATION**  
15659 Lathrop Avenue, Harvey, Illinois

Get the facts now—  
send for Bulletin No. 80,  
"Whiting Engineered Cranes."



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# FACTS ABOUT **Exide**<sup>®</sup>

## IRONCLAD<sup>®</sup> INDUSTRIAL TRUCK BATTERIES

**WORLD'S LARGEST UNDERGROUND "REFRIGERATOR"**  
**STORES MORE FOOD FASTER...**  
**SAFER WITH EXIDES!**

IN AREAS REFRIGERATED TO SUB-ZERO TEMPERATURES A RAPID AND UNIFORM RATE OF MOVING FOODSTUFFS FROM LOADING PLATFORMS TO STORAGE CHAMBERS IS ASSURED BY EXIDE-POWERED ELECTRIC TRUCKS AT NATURAL STORAGE COMPANY IN BONNER SPRINGS, KANSAS. EXIDE-IRONCLADS WORK DEPENDABLY UNDER SEVERE OPERATING CONDITIONS—PROVIDE POWER WITHOUT CONTAMINATING FUMES OR NOISE. EXIDE-IRONCLADS PROVIDE THE SAFEST, FASTEST, LOWEST COST METHOD OF MOVING—STACKING—STORING MATERIALS. EXIDES ARE ALWAYS—  
**YOUR BEST MOTIVE POWER BUY-AT ANY PRICE!**



**MOVE TEN TONS  
 FOR A PENNY!**

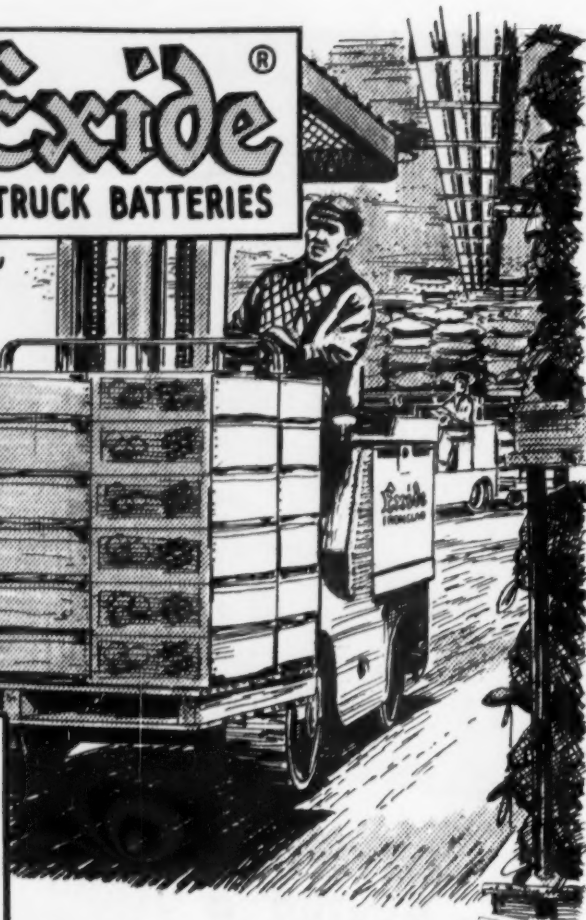
**...WITH DEPENDABLE EXIDE-IRONCLAD POWER**

THIRTY-SEVEN CENTS A DAY BUYS THE POWER TO KEEP AN ELECTRIC TRUCK ON THE JOB ALL SHIFT LONG—MOVING 340 TONS! COMPARE THIS LOW OPERATING COST WITH THAT FOR ANY OTHER TYPE OF POWER. YES, EXIDE DEPENDABILITY AND EXCEPTIONALLY LONG USEFUL LIFE RESULTS IN LOWEST HANDLING COSTS PER TON!

LET EXIDE HELP SOLVE YOUR INDUSTRIAL TRUCK BATTERY PROBLEMS. ① CALL AN EXIDE SALES ENGINEER FOR FULL DETAILS. ② WRITE FOR FORM 1982, A MANUAL ON INSTALLING AND MAINTAINING MOTIVE POWER BATTERIES.

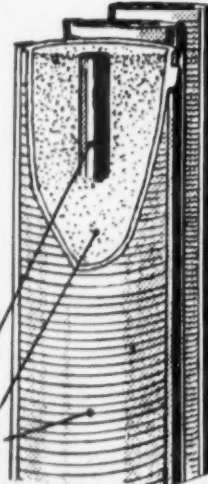
**Exide INDUSTRIAL DIVISION**, The Electric Storage Battery Company, Philadelphia 2, Pa.

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### **TUBES OF POWER WORK FOR YOU INSIDE AN IRONCLAD**

FINELY SLOTTED TUBES INSIDE AN IRONCLAD KEEP THE ACTIVE MATERIAL IN FIRM CONTACT WITH THE CONDUCTING GRIDS OF THE POSITIVE PLATE. THUS, THE GRID IS PROTECTED...THE ACTIVE MATERIAL IS KEPT IN CONTACT WITH THE GRID LONGER... **THE BATTERY'S WORK LIFE IS LENGTHENED.** THE SLOTTED TUBES ALSO EXPOSE MORE ACTIVE MATERIAL TO THE ELECTROLYTE... **FOR GREATER POWER!** RESULT: THE IRONCLAD'S ABILITY TO DO A DEPENDABLE JOB FOR A LONGER PERIOD OF TIME.



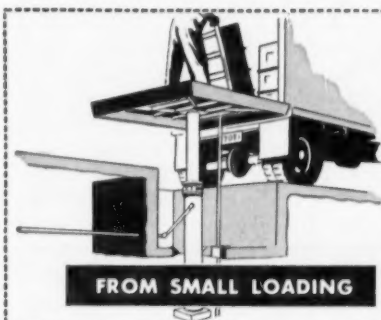
PROTECTED SILICIUM CONDUCTING GRID  
 COMPRESSED ACTIVE MATERIAL  
 SLOTTED POLYETHYLENE RETAINER TUBE



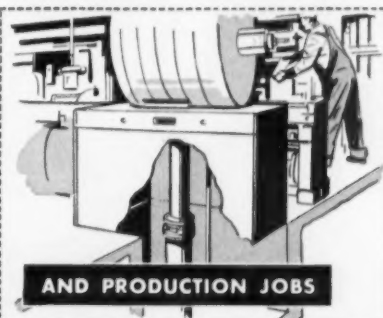
wherever the need...  
whatever the size...

# GLOBE OiLIFTS

## QUICKLY INSTALLED...QUICKLY RETURN THEIR COST!



FROM SMALL LOADING



AND PRODUCTION JOBS

### TO LOAD MACHINES

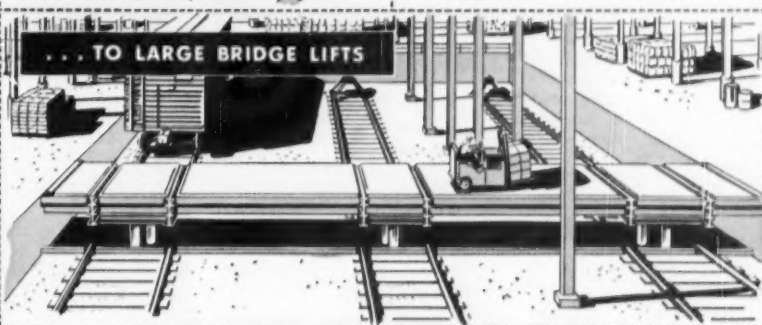
(Left) Globe OiLIFTS position bulky materials to speed production of machines and processes.

### TO CROSS A DEPRESSED AREA

(Below) Synchronized hydraulic cylinders raise giant Globe bridge lifts from railroad track level to loading dock height, permitting two-lane traffic of heavily loaded fork trucks.

### TO LOAD TRUCKS

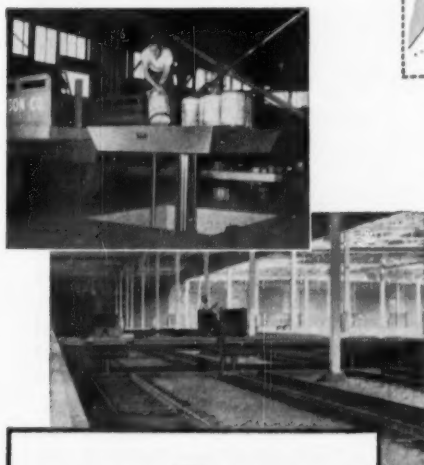
(Above) Where no loading platforms are available, Globe OiLIFTS quickly raise heavy loads to truck bed level. In "down" position, platforms are flush with floor, permitting free cross travel of men and vehicles.



Whether the load is 1,000 lbs., or 50,000 lbs. . . whether the lift is a few inches or 50 ft. . . the Globe OiLIFT which does the job is assembled with standard production line components. Oil-hydraulic cylinders, platforms, power units and control systems are available . . . stress and performance tested . . . for initial low cost, early shipment and quick installation.

So, whether you want to cut costs in truck loading, eliminate the hazards of a ramp, route traffic across recessed railroad tracks, or any of countless lifting or materials handling operations, there's a readily-available OiLIFT to do the job.

The free book: "Case Studies in Modern Lifting" tells what other firms in your industry are doing to speed lifting work and cut costs. Write for your copy today.



# GLOBE

®

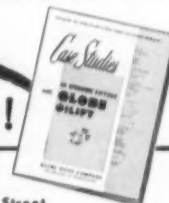
# OILIFTS

PLANTS: DES MOINES—PHILADELPHIA—LONG BEACH, CAL.



PLATFORM LIFTS ELECTRO-LOADERS ELEVATORS TRUCK DUMPS SELF-LEVELING RAMPs BASCULE BRIDGE LIFTS VERTICAL BRIDGE LIFTS

Get your  
**FREE COPY today!**



GLOBE HOIST COMPANY  
East Mermel Lane at Queen Street  
Philadelphia 18, Pennsylvania

Please send me additional information on Globe OiLIFTS as described in the FREE booklet "Case Studies in Modern Lifting."

Name.....  
Company.....  
Address.....  
City..... State.....

F.705-PL

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Step up the pace  
of your packing line...  
with  
**ALVEY  
CONVEYORS**

This live roller conveyor packing line is fed by strategically placed spurs running from every packing station. The moment a box is filled, it's on the way (and out of the way) to shipping or storage without delay.

Here is another example of the many ways ALVEY engineered conveyor systems can save manpower and speed production in your plant. For more ideas, we will be happy to send a textile-experienced ALVEY engineer to visit your plant and make suggestions. Simply drop us a line.



Every time you MANhandle a product, you add to its cost...without adding to its value.

So, for profit's sake...convey your products.

# ALVEY

**ALVEY CONVEYOR MANUFACTURING COMPANY**

9299 Olive Street Road, St. Louis 24, Missouri

Branch Offices in Principal Cities

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## HIGHLIGHTS of the month's NEWS

**Y**OU'VE often heard the remark, "Material handling's in my blood—I just can't get away from it." And, you've probably said the same thing yourself, because it's a business that gets under your skin, and it's a constant challenge. Today, industry has recognized the part played by material handling engineers; many colleges are offering courses on the subject and a few of them offer degrees. Proof enough that rather than just being a job, material handling has become a full-fledged career.

On the subject of careers, Dr. Spencer A. Larsen, director of Wayne University's Material Management Center, had some interesting comments to make before a group of high school graduates and industry men. Speaking at Louisville, Kentucky, as a guest of the Falls Cities Chapter of the American Material Handling Society, Dr. Larsen outlined a number of possibilities open to youth interested in material handling: with a user company, a manufacturer, as a sales representative, consulting engineer or teacher.

"If you go into basic industry generally," said Dr. Larsen, "you will devise, install, supervise and maintain material handling equipment... Regardless of the kind of job you may have, it is important to recognize that handling cannot be separated from plant layout, packaging, warehousing, traffic, transportation and material control; you will find it to your advantage to be cognizant of and understand the fellows who are charged with responsibility for related functions."

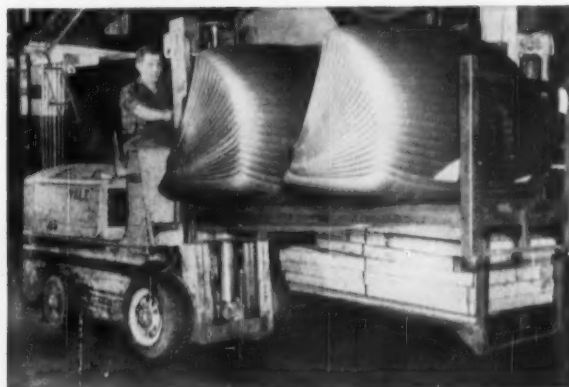
Is it any wonder that we're fascinated by the never-ending challenge presented by this industry? Nothing else we can think of offers the same opportunities for creative thinking and beneficial action. And the surface has just been scratched.

# B.F. Goodrich

**Industrial tires wear longer, resist cuts better, automotive stampings company reports**



Crane lifts a giant steel bar in the factory yard.



Tires roll on oily floors to carry deck lids out of the Press Shop.



Finished cowl panels are delivered to Shipping Dept.



Scrap material that can injure tires is stored in Wood Mill.

THESE photographs were taken at the Detroit, Michigan, factory of one of the country's leading manufacturers of automotive stampings. Here over 200 materials handling units work in the yard or on floors often covered with tire-killing iron and steel scrap and oil. Premature tire failure could be common. But it's not, thanks to B. F. Goodrich industrial tires.

B. F. Goodrich industrial tires are hard to beat, the supervisor of truck repairs reports. They wear longer and resist cuts better than other tires. That's because the B. F. Goodrich Tire and Wheel Analysis man matched the tires to the job.

## You can have a FREE TW Analysis, too

The B. F. Goodrich Tire and Wheel Analysis man will study your equipment, loads, hauling surfaces and any special problems you have. Then he'll recommend the right industrial tires for you to use—the right type, size, tread compound and tread design. You can save as much as 50% from this service, as much as 20% from the maintenance tips he gives. His services are FREE and unbiased, because B. F. Goodrich makes a complete line of industrial tires.

Mail the coupon today. Consulting engineering service is available to manufacturers of materials handling equipment.

**Specify  
B. F. Goodrich tires  
when ordering  
new equipment**



The B. F. Goodrich Company  
Tire & Equipment Division  
Department TW-531, Akron 18, Ohio

Please send me additional information  
on your Tire and Wheel Analysis Plan

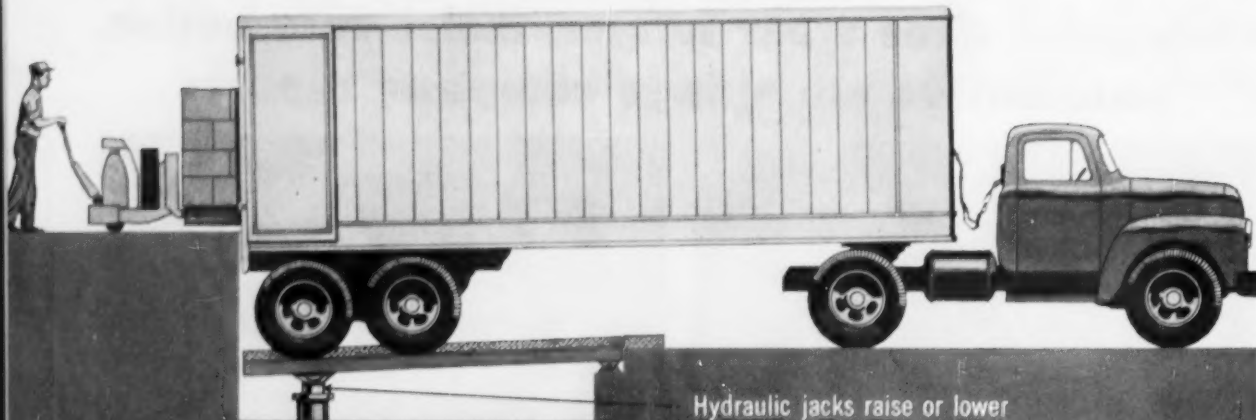
Name \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



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# How OILDRAULIC<sup>®</sup> equipment



Hydraulic jacks raise or lower trailer to dock level for fastest loading and unloading

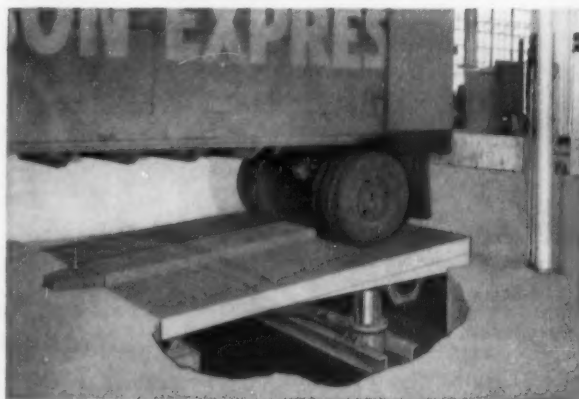


## TRUCK LEVELER saves loading costs and dock space

**The Rotary Truck Leveler** provides fastest loading and unloading of any highway carrier at any loading dock. Installed in the driveway in front of the loading dock, it takes no space and leaves the platform completely free of obstructions.

**Dual hydraulic jacks** with 40,000-lb. capacity raise or lower the truck or trailer to bring the bed level with the dock. Pallet trucks and other equipment can move in and out with maximum speed and safety. Less labor is required. A raised center curb section provides fast, accurate truck positioning.

**Operation** is by economical, maintenance-free Rotary Oildraulic electric power unit. Rotary Truck Levelers can be installed easily in new or old buildings.



**LEVA-DOCK<sup>®</sup>**

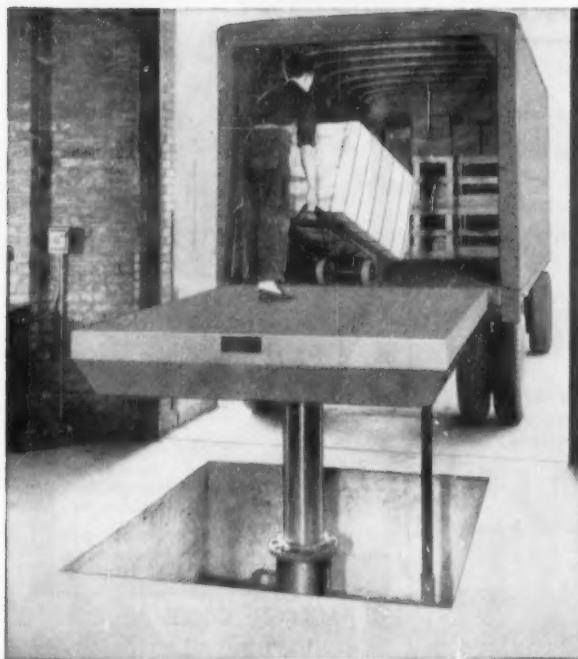
## self-leveling hydraulic ramp

**This hinged** steel trucking platform moves up or down automatically to stay level with the truck or trailer bed during loading and unloading. It speeds handling, reduces breakage and increases safety by compensating for varying truck bed heights, truck spring deflection and out-of-level beds. Economical hydraulic operation.

**ROTARY LIFT CO., MEMPHIS, TENN.**

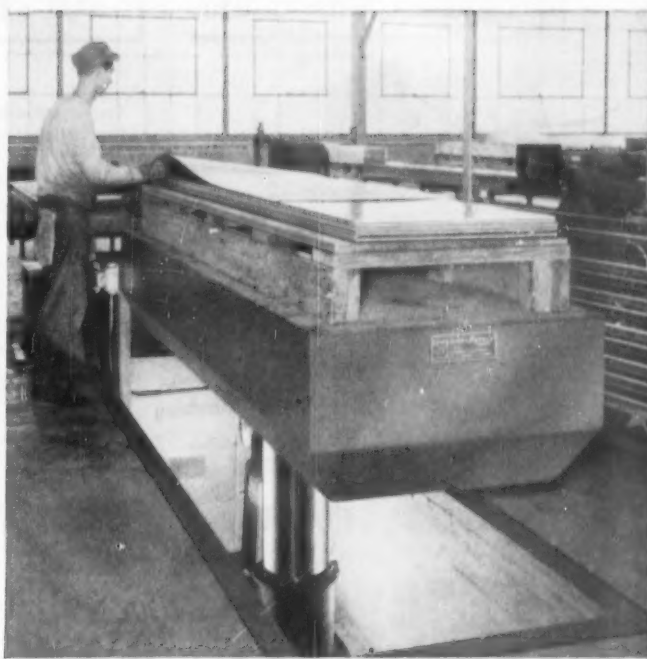


# will slash your labor costs



## LEVELATOR® LIFTS RAISE HEAVY LOADS

Raise loads by hydraulic power directly from plant floors to trucks, freight cars or different building levels. Levelator Lifts speed plant traffic and save valuable floor space. When lowered, the platform becomes part of the floor and can be trucked over in any direction. Levelator Lifts are available in any size and capacities up to 100,000 lbs.



## MACHINE-FEEDING LEVELATOR® SPEEDS WORK

Use hydraulic power, not men, to raise and lower heavy stock. Materials are always at most convenient height for fast, continuous feeding. Production rates of machines can be maintained at top levels. Safe, dependable, economical hydraulic operation. Equipment can be custom-built to fit your requirements.



## OILDRAULIC TRANSFER BRIDGE SPANS TRACKS

This hydraulically operated bridge forms a roadway to permit plant traffic to move quickly across spur tracks. Eliminates detours and congestion. When lowered, the rails on the Transfer Bridge become a part of the railroad track. Dual-jack, drawbridge and other types of transfer bridges are also built by Rotary Lift Co. This equipment can be designed to fit your particular needs.

**ROTARY LIFT CO., MEMPHIS, TENN.**



## OILDRAULIC® INDUSTRIAL LIFTS

### MAIL FOR COMPLETE DATA

ROTARY LIFT CO.

1038 Kentucky, Memphis 2, Tenn.

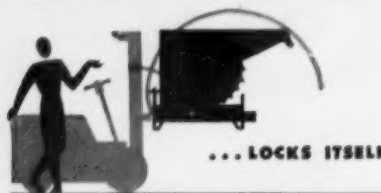
Send me information on:

☐ Truck Levelers ☐ Leva-Dock Ramps ☐ Levelator Lifts  
☐ Machine-Feeding Levelators ☐ Transfer Bridges

Name.....

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Circle No. 152 on Reader Service Card for more information



## and lives a long and useful life

Not only do Roura Self-Dumping Hoppers cut handling and unloading costs of wet or dry, hot or cold bulky materials 50% or more... they do it year after year with little maintenance or repair. That's because Roura Self-Dumping Hoppers are engineered to take "hard knocks"... extra heavy gauge metal... sturdy arc-welded joints... perfect balance for smooth and rhythmic operation.

The rugged Roura gives you simple one-man semi-automatic operation. Models to fit any standard fork or platform lift truck. Also available mounted on live skids, or with malleable or rubber tired wheels or casters. Sizes range from  $\frac{1}{2}$  to 2 cubic yards.

## ROURA Self-Dumping HOPPER



**WANT MORE DETAILS** on how you can save money with Roura? Just clip this coupon... attach it to your letterhead... sign your name... and mail to

**ROURA IRON WORKS, INC.**

1411 Woodland Ave., Detroit 11, Michigan

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66

## Calendar of Events

### September 6-8

Material Handling Institute,  
Greenbrier Hotel,  
White Sulphur Springs, West Virginia

### September 6-17

Production Engineering & Auto-  
mation Exposition,  
Navy Pier,  
Chicago, Illinois

### September 6-17

Machine Tool Show,  
International Amphitheatre,  
Chicago, Illinois

### September 12-16

Instrument Society of America,  
10th Annual Conference and Exhibit,  
Shrine Exposition Hall and  
Auditorium,  
Los Angeles, California

### September 20-22

10th Industrial Packaging & Material  
Handling Show,  
Kingsbridge Armory,  
New York, New York

### October 5-9

World Plastics Fair & Trade Expositi-  
tion,  
National Guard Armory,  
Exposition Park,  
Los Angeles, California

### October 10-12

Joint Military-Industry Symposium on  
Packaging and Material Handling,  
Washington, D. C.

### October 17-21

National Metal Exposition & Con-  
gress,  
Convention Hall,  
Philadelphia, Pa.

### October 24

2nd Montreal TIPAC Forum,  
Sheraton-Mount Royal Hotel,  
Montreal, Quebec

### November 8-10

4th Canadian National Packaging Ex-  
position and Concurrent National  
Conference,  
Automotive Building,  
Canadian National Exhibition  
Grounds,  
Toronto, Ontario

### November 9-11

19th Annual Time and Motion Study  
and Management Clinic,  
Sherman Hotel,  
Chicago, Illinois

### November 13-18

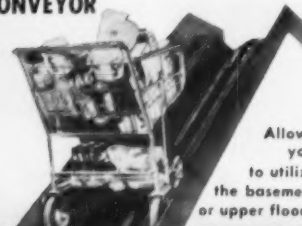
75th Anniversary Annual National  
Meeting,  
American Society of Mechanical En-  
gineers,  
Chicago, Illinois

### November 14-17

Second International Automation  
Exposition,  
Navy Pier,  
Chicago, Illinois

## ALL-STEEL FLOOR-TO-FLOOR CONVEYORS

### SUPER-MARKET SHOPPING CART CONVEYOR



### PALLET CONVEYOR



### PACKAGED GOODS CONVEYOR (Space Saver)

Will  
operate  
on a  
steep  
angle.

Conveys boxes,  
crates, cartons,  
bales etc. from  
floor to floor.  
Very fast.



### HAMPER & TRUCK CONVEYOR

For further information and  
catalog write today.  
No obligation of course.

## WEHLE CONVEYOR COMPANY

25 WASHINGTON ST. BINGHAMTON, N. Y.

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FLOW

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# WRIGHT Electric Hoists for Top Production, Easiest Maintenance

**WRIGHT** *Speedway* Electric Hoists—Frame 1, Frame 2 and Frame 3—are ideal **HOISTS** for handling production materials where the load requirements **ARE** from ¼ ton to 10 ton capacity. Their design includes many advanced **SAFE** operating features. Sound choice of components provides them with **EFFICIENT** balance for smooth running. Parts are designed and built to give **RUGGED** performance with a minimum of care. Plant operating men find them **ADAPTABLE** to almost every type of shop work because of the wide range of speeds, lifts and mountings.

*The more particular you are in your selection of hoisting equipment—the more likely you are to choose WRIGHT*

Write our York, Pa., office for any or all of these fully informative bulletins—

**Bulletin DH-133B** on Frame 1 and 1½ WRIGHT Speedways

**Catalog E-54A** on Frame 2 and 3 WRIGHT Speedways

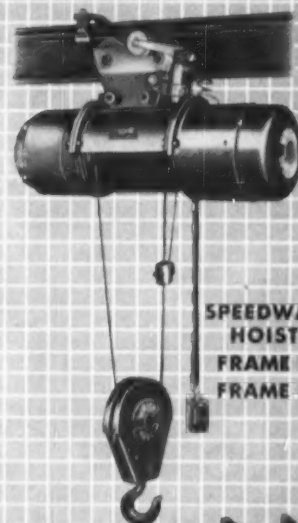
**Bulletin DH-504** on WRIGHT Electric Roller Chain Hoist



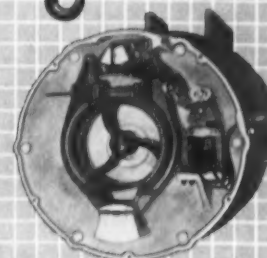
## Wright Hoist Division AMERICAN CHAIN & CABLE

York, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

for  
Better  
Value



**SPEEDWAY  
HOIST  
FRAME 2  
FRAME 3**



**MOTOR BRAKE & SOLENOID  
FRAME 2 and FRAME 3 HOIST**  
"Nothing to adjust but the cam!"



### WRIGHT Electric Roller Chain Hoist

- ¼, ½, 1 and 2-ton capacities
- Fewest number of wearing parts
- Self-locking, double-worm gear acts as own load brake
- Spring-set, shoe-type motor brake, clam shell type
- Oversize precision ball bearings
- Forged steel-alloy hook, swings and swivels

**COMPETITIVELY PRICED**



**THIS DOUBLE-WORM GEAR  
ELIMINATES TROUBLESOME  
LOAD BRAKES**



**SPEEDWAY  
HOIST  
FRAME 1  
(also FRAME 1½)**



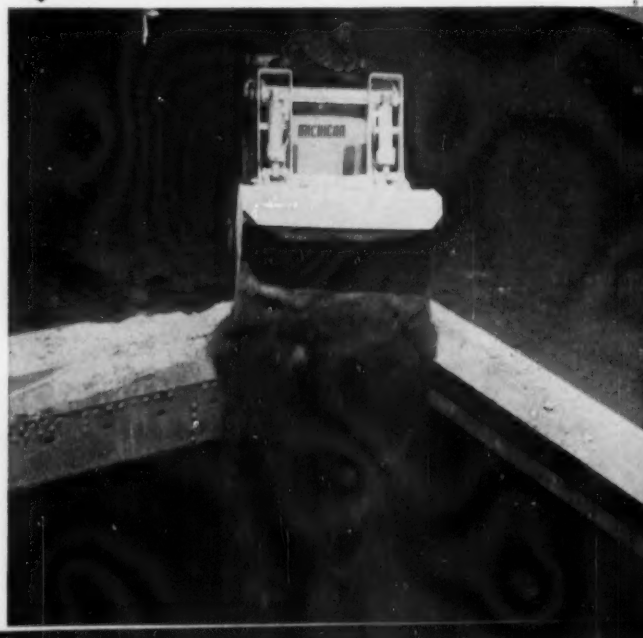
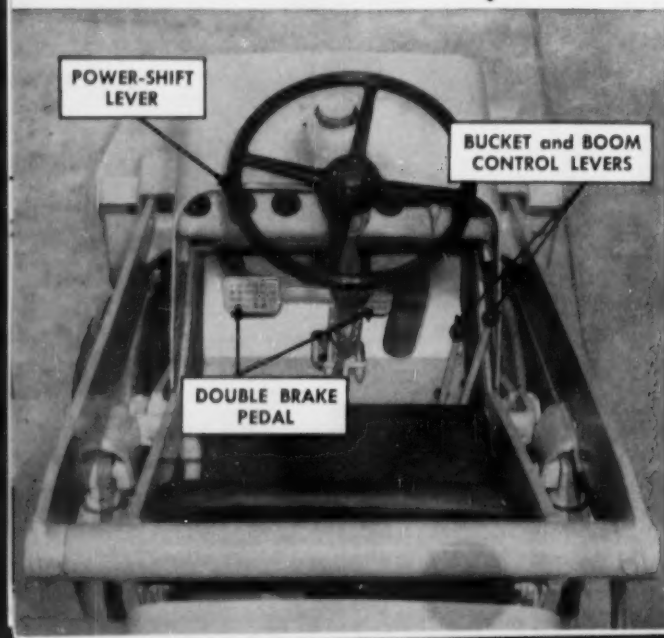
**MOTOR BRAKE  
FRAME 1 and FRAME 1½**  
"Nothing to adjust but the cam!"





**It's a pleasure to work here!** There's plenty of leg room in the 12B because there are fewer operating controls . . . no clutch pedal, no conventional gear-shift levers. The power-shift lever on the steering column controls the shifts: High—11.2 mph; Low—5.6 mph; Reverse—10.5 mph.

**LOOK, NO CLUTCH.** Without taking his left hand from the steering wheel, the operator can move the power-shift lever to any speed or direction . . . even when moving. The right hand is free for the bucket controls; feet are free for brake and accelerator. The 12B is more maneuverable in tight quarters because the operator doesn't have to stop to shift.





# Report on the 15 cu. ft. MICHIGAN 12B:

## **New Tractor Shovel features power-shifting, twenty per cent more weight and power**

Heavier and more powerful than comparable machines, and infinitely easier to operate—that's the new MICHIGAN 12B. There's no clutch pedal or engine clutch on the 12B: Clark's power-shift transmission completely eliminates this notorious cause of excessive maintenance and down time. From the cutting edge of the 15 cu. ft. bucket to the flywheel of the 44 or 42 horsepower engine (gas or diesel), the MICHIGAN 12B is simply *more* machine.

**20% more weight and power.** At 6250 lbs. (6350 lbs. diesel), the 12B is 20% heavier than most machines in its class. With 44 or 42 horsepower, gas or diesel, it is 20% more powerful. This margin of weight and power, plus bucket break-out action, enables the 12B to dig its way into material where other machines merely spin their wheels. The 12B's extra weight, low center of gravity and low-level bucket carry-position contribute to its superior stability: you can handle maximum loads safely and fast within its short turning radius.

**Exclusive Clark power-train.** The complete power-train of the new 12B is designed and manufactured by Clark. This combination of torque converter, power-shift transmission and planetary wheel axle gives you the most advanced industrial power-train on the market today. It was designed especially for

industrial Tractor Shovel service—based on Clark's many years of experience as the leading manufacturer of industrial material handling equipment.

**Instant power-shifting.** Engine torque is multiplied up to 300% by the Clark torque converter—automatic torque build-up as you meet tighter, tougher materials. To shift between High, Low or Reverse, simply push the single power-shift lever to the desired position. Hydraulic power in the constant mesh power-shift transmission makes any shift instantly, even when travelling. There's no clutch pedal, no engine clutch, no gear clash. And as any operator will tell you, *it sure beats riding a heavy clutch all day!*

**Complete dust protection.** The 12B is protected against dust and dirt in every conceivable way. An oil bath air cleaner filters the air which enters the main hydraulic reservoir. There is a filter for the torque converter oil and the power-shift transmission oil. A partial flow filter protects the engine lube oil. Transmission, torque converter, starting motor and generator are all dust-sealed. On the 12B, every precaution has been taken to avoid dust problems.

**Make your own comparison.** Neither words nor specifications can indicate the working superiority of the new MICHIGAN 12B. You've got to see it in action—see it handling your toughest job. Call your local MICHIGAN distributor or write us direct to arrange an on-the-job demonstration. The new 12B is available on a low cost, no-down-payment Lease Plan—ask for details. Whether you lease or buy the 12B, it will pay for itself faster than any Tractor Shovel you've ever seen. See it!

MICHIGAN is a trade-mark of Clark Equipment Co.

**CLARK  
EQUIPMENT**

**CLARK EQUIPMENT  
COMPANY**  
Construction Machinery  
Division  
440 Second Street  
Benton Harbor 36, Michigan



← **Rugged bucket mechanism.** The 12B's bucket mechanism is designed for strength and simplicity. There are no bell cranks; the boom and guide bar are straight members with fewer wearing parts. At 4 inches off the ground, you get 38 degrees tip-back. Positive "stops" on the bucket carrier provide clean dumping action.

Circle No. 41 on Reader Service Card for more information



# CATALOGS

offered in

**Automatic Conveyor . . .** Technical information on automatic conveyor systems may be obtained from Jervis B. Webb Co.  
Circle 181 on Reader Service Card

**Interchangeable Attachments . . .** Literature from The Yale & Towne Manufacturing Co. tells about fork trucks with interchangeable attachments for a variety of handling jobs.  
Circle 49 on Reader Service Card

**Terminal Trucks . . .** The more man hours you save, the more dollars you earn, says literature from Jakes Foundry Company that tells about money-saving features of terminal trucks.  
Circle 90 on Reader Service Card

**Waterproof Paper . . .** Free samples and packaging information on Fibreen, a waterproof paper, is offered by American Siaalkraft Corporation.  
Circle 13 on Reader Service Card

**Live Rollers . . .** Every time you manhandle a product, you add to its cost without adding to its value, says literature from Alvey Conveyor Manufacturing Company that suggests live roller conveyors for stepping up your pace.  
Circle 197 on Reader Service Card

**Wheelbarrows . . .** Data is available from Sterling Wheelbarrow Co. on wheelbarrows for a variety of handling jobs.  
Circle 166 on Reader Service Card

**LP-Gas Sweeper . . .** G. H. Tennant Company offers details on its LP-Gas equipped sweeper.  
Circle 171 on Reader Service Card

**Hydraulic Tables . . .** Bulletin published by Lange-Lift Company gives facts about hydraulic work tables, their uses and advantages.  
Circle 96 on Reader Service Card

**Shelving . . .** DeLuxe Metal Furniture Co. offers data on steel storage shelving said to cut installation expense 50 percent.  
Circle 56 on Reader Service Card

**Conveyor . . .** Bulletin from A. B. Farquhar Division of The Oliver Corporation covers power-belt and gravity conveyors.  
Circle 66 on Reader Service Card

**Boxes . . .** Tote-shop boxes that stack securely and conveniently are detailed in literature available from Cesco Container Co.  
Circle 40 on Reader Service Card

**Dock Covers . . .** Literature from Capco describes dock covers that give year 'round protection.  
Circle 38 on Reader Service Card

**Dock Levelers . . .** Booklet published by The Wayne Pump Company tells how to speed loading at your plant.  
Circle 180 on Reader Service Card

**Low-Lift Electric . . .** If you've a problem of long hauls, stock picking, loading or unloading, literature from The Raymond Corporation suggests the model EL4F low-lift electric truck.  
Circle 146 on Reader Service Card

**Industrial Batteries . . .** Gould-National Batteries, Inc. has available data on industrial batteries built to give greater capacity.  
Circle 76 on Reader Service Card

**Belting . . .** Victor Balata & Textile Belting Co. has prepared full information on engineered conveyor belting in a range of types, widths and thicknesses.  
Circle 177 on Reader Service Card

**Functional Papers . . .** Brochure offered by Thilmany Pulp & Paper Company contains paper samples and diagrammatic illustrations to help save costly claims.  
Circle 167 on Reader Service Card

**Monorail Hoist . . .** Whether you have a need for constant or intermittent service, there's a monorail hoist to fit your needs, says literature from Shepard Niles Crane and Hoist Corporation.  
Circle 157 on Reader Service Card

**Air Hoist . . .** Details on an air hoist to fit your job—from 100- to 2000-pounds—is offered by The Aro Equipment Corporation.  
Circle 18 on Reader Service Card

# and BULLETINS

advertisements in this publication

**Conveyor Specialties . . .** Literature published by Metzgar Conveyor Co. gives details on conveyor specialties, as well as standard units.

Circle 118 on Reader Service Card

**Highlift Walkie . . .** Catalog 34 published by Lewis-Shepard Products Inc. tells how to operate in 5'3" aisles with the Jackstacker.

Circle 101 on Reader Service Card

**Tote Box Truck . . .** Folder F from Rolock Inc. tells how to roll your load without strain with "George", the tote box truck.

Circle 150 on Reader Service Card

**Mobile Radio . . .** New booklet from Radio Corporation of America tells how radio control cuts material handling costs.

Circle 144 on Reader Service Card

**Floor Cranes . . .** Hydraulic floor cranes in capacities up to three tons are outlined in a catalog by Ruger, Inc.

Circle 155 on Reader Service Card

**Transfer Cars . . .** Motorized transfer cars in capacities from 15 tons are described in literature available from Salem-Brosius, Inc.

Circle 140 on Reader Service Card

**Conveyors . . .** All types of gravity and power conveyors are described in literature published by Mathews Conveyor Company.

Circle 113 on Reader Service Card

**Straddle-Type Truck . . .** John Morrell Mfg. Co. offers complete information on the MorLift, a straddle-type electric truck.

Circle 122 on Reader Service Card

**Lever-Dollies . . .** Circular available from Micron, Inc. tells how to move more for less with Micro lever-dollies.

Circle 119 on Reader Service Card

**Hook Scale . . .** A new kind of hydraulic hook scale said to assure almost 100 percent accuracy is described in literature available from Martin-Decker Corp.

Circle 111 on Reader Service Card

**Steel Containers . . .** Pittsburgh Steel Products Company tells the Cargotainer story in a free booklet titled "Duty Designed".

Circle 141 on Reader Service Card

**Solid Tires . . .** Booklet from Phoenix Manufacturing Co. gives information on the firm's cured-on solid industrial tires.

Circle 139 on Reader Service Card

**Car Door Opener . . .** Free literature from The Nolan Company tells how one man can open any box car in 20 seconds or less.

Circle 132 on Reader Service Card

**Steel Shelving . . .** Bulletin 701 offered by The Frick-Gallagher Mfg. Co. outlines quickly assembled shelves for every load.

Circle 70 on Reader Service Card

**Boxes and Baskets . . .** The Chas. Wm. Doepke Mfg. Co., Inc. offers details on its guarantee to reduce your small parts handling costs.

Circle 54 on Reader Service Card

**Packaging Material . . .** Information on Ply-Veneer, a new packaging material, may be obtained from Weyerhaeuser Timber Company.

Circle 182 on Reader Service Card

**Floor-to-Floor Conveyor . . .** Wehle Conveyor Company has published a catalog which contains complete information on floor-to-floor conveyors.

Circle 194 on Reader Service Card

**Battery Maintenance . . .** Manual 1982 from The Electric Storage Battery Company contains information on installing and maintaining motive power batteries.

Circle 60 on Reader Service Card

**Electric Walkie . . .** Lift Trucks Incorporated offers complete data on its HydroLectric walkie truck with the interchangeable power unit.

Circle 103 on Reader Service Card

**Engine Hour Meters . . .** Bulletin I.T. from The Service Recorder Co. tells how Servis Recorders have helped large manufacturing plants operate successfully.

Circle 156 on Reader Service Card

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## CATALOGS AND BULLETINS

Continued

**Tape Dispenser . . .** Free booklet published by Derby Sealers, Inc. tells how to cut shipping room costs.

Circle 51 on Reader Service Card

**Ladders . . .** A complete catalog on Safety-Step ladders is off the press by Ballymore Company, and free upon request.

Circle 26 on Reader Service Card

**Fibre Containers . . .** Catalog published by National Vulcanized Fibre Co. pictures fibre containers in a wide variety of sizes, shapes and designs.

Circle 68 on Reader Service Card

**Electric Fork Truck . . .** Literature illustrating and describing electric fork trucks is offered by Mercury Manufacturing Co.

Circle 115 on Reader Service Card

**Case Marker . . .** Descriptive literature from Adolph Gottscho, Inc. tells how the Rolacoder automatically marks all four sides of cases in a single pass.

Circle 75 on Reader Service Card

**Recorder-Totalizer . . .** Heat-Timer Corporation offers descriptive literature on its time recorder-totalizer.

Circle 78 on Reader Service Card

**Drum Carrier . . .** Data on drum handling is offered by Walz & Krenzer, Inc.

Circle 179 on Reader Service Card

**Floor Trucks . . .** Towsley Trucks, Inc. invites your inquiry on general and special floor trucks.

Circle 173 on Reader Service Card

**Self-Dumping Hopper . . .** Roura Iron Works, Inc. offers details on how you can save money with its Roura self-dumping hopper.

Circle 153 on Reader Service Card

**Process Belts . . .** Illustrated catalog F55 published by Ashworth Bros., Inc. tells how to keep your product on the move with metal process belts.

Circle 19 on Reader Service Card

**Packaged Power Conveyor . . .** Complete information and descriptive catalog on the R-W 460 packaged power conveyor is offered by Richards-Wilcox Mfg. Co.

Circle 149 on Reader Service Card

**Fibre Drums . . .** Information may be obtained from Continental Can Company on fibre drums of any size, style or design.

Circle 196 on Reader Service Card

**Industrial Casters . . .** A broad range of sizes, types and capacities of industrial casters are listed in literature available from Albion Industries, Inc.

Circle 4 on Reader Service Card

**Tractor Shovel . . .** The Baker-Raulang Company has published literature which tells how to save up to \$400 on the initial cost of a Shovel loader.

Circle 23 on Reader Service Card

**Portable Elevators . . .** Catalog 55 available from Economy Engineering Co. contains 40 pages of pictures and suggestions for special and standard machines.

Circle 59 on Reader Service Card

**Automatic Printing . . .** Catalog published by Industrial Marking Equipment Co., Inc. describes the Autoprinter, a machine that dates, marks or codes.

Circle 88 on Reader Service Card

**Structural Framing . . .** Illustrated catalog offered by Versabar Corp. tells about structural framing material requiring no special tools for erection.

Circle 106 on Reader Service Card

**Lifting Equipment . . .** The Colson Corporation has prepared a booklet on lifting equipment for a variety of jobs.

Circle 44 on Reader Service Card

**Fork Trucks . . .** Free facts book from Allis-Chalmers Manufacturing Co., Buda Division, gives inside engineering facts about gas and diesel fork trucks.

Circle 36 on Reader Service Card

**Automatic Conveyors . . .** Fully automatic material handling systems are discussed in catalog 953 offered by Allied Steel and Conveyors, Inc.

Circle 6 on Reader Service Card

**Power Sweeper . . .** Literature from Wayne Manufacturing Co. pictures and describes a new machine engineered to sweep more than 100,000 square feet per hour.

Circle 200 on Reader Service Card

**Castors . . .** The Bassick Company has available literature on a new line of casters designed to meet military specifications and called "MilSpec".

Circle 29 on Reader Service Card



**Fork Trucks . . .** Clark Equipment Company offers information on high stacking fork trucks.

Circle 42 on Reader Service Card

**Handling Devices . . .** Merrill Brothers has available information on a variety of drum handling devices, clamps and grips.

Circle 117 on Reader Service Card

**Electric Walkies . . .** Bulletin 54 offered by The Moto-Truc Co. contains informative data on walkie and small rider type trucks.

Circle 125 on Reader Service Card

**Industrial Tires . . .** Information on solid industrial tires is available from Goodyear Tire & Rubber Co.

Circle 74 on Reader Service Card

**Electric Trucks . . .** Booklet covering electric trucks and titled "Materials Handling Cost Cutter" is offered by Automatic Transportation Company.

Circle 21 on Reader Service Card

**Addressing Systems . . .** Complete information on direct-to-container addressing systems is offered by Weber Marking Systems.

Circle 182 on Reader Service Card

**Expendable Pallets . . .** Economical handling with expendable pallets is discussed in literature available from Signode Steel Strapping Co.

Circle 158 on Reader Service Card

**Magnesium Dockboards . . .** Ten advantages of Magliner dockboards are pointed out in data offered by Magline, Inc.

Circle 108 on Reader Service Card

**Floating Ramp . . .** Information on Trans-O-Matic floating ramps is offered by Globe Hoist Company.

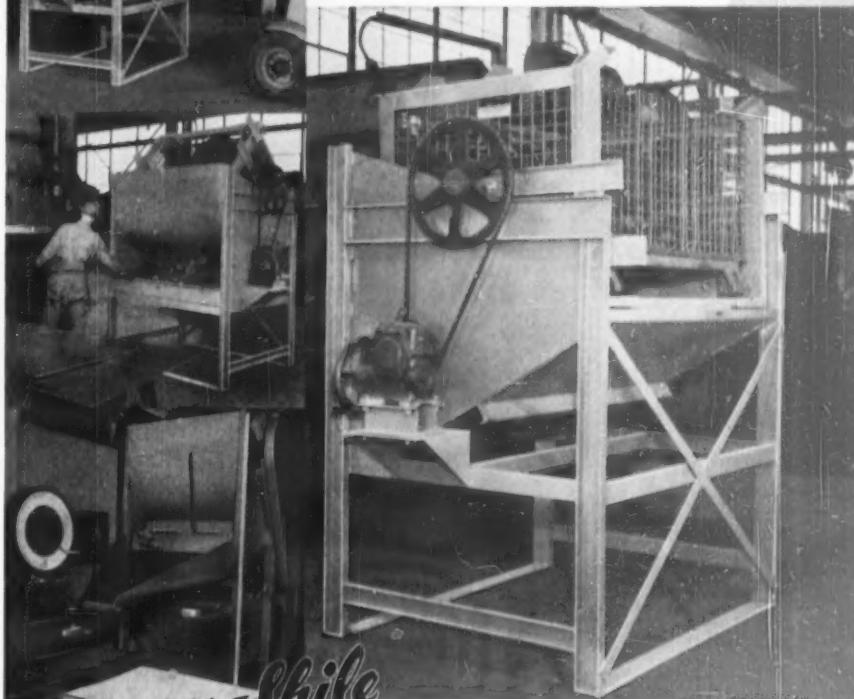
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**IT'S NEW...**

**Simple, Time - Saving,  
Cost - Reducing, EFFICIENT,  
CONVENIENT EQUIPMENT for  
Controlled Dumping Operations**



*Palmer-Shile*

Item C-1390

## **BOX ROTOR DUMPER with Feeding Stand . . .**

**DUMPS  
any size  
BOX  
any type  
old or new  
WIRE  
STEEL  
WOOD  
or  
COMBINATION**

**Write or Phone  
for complete information. Do it today!**

### **COST-REDUCING:**

Saves cost of equipment for particular operations, time-consuming handling of special size and box types.

### **SIMPLE TO OPERATE:**

Load feeding stand by fork truck. Manually, Electrically or Air operated set of gears tilts box, empties parts into stand tray.

### **CONVENIENT:**

Dumper may be transported for use in any plant area.

### **EFFICIENT:**

Continuous flow of materials to feeding tray is made possible.

Palmer-Shile box rotor dumper is built to customer specifications of heavy duty, all-steel reinforced construction. Manual, electric or air operated rotors optional.

DESIGNED AND MANUFACTURED BY

*Palmer-Shile Co.*

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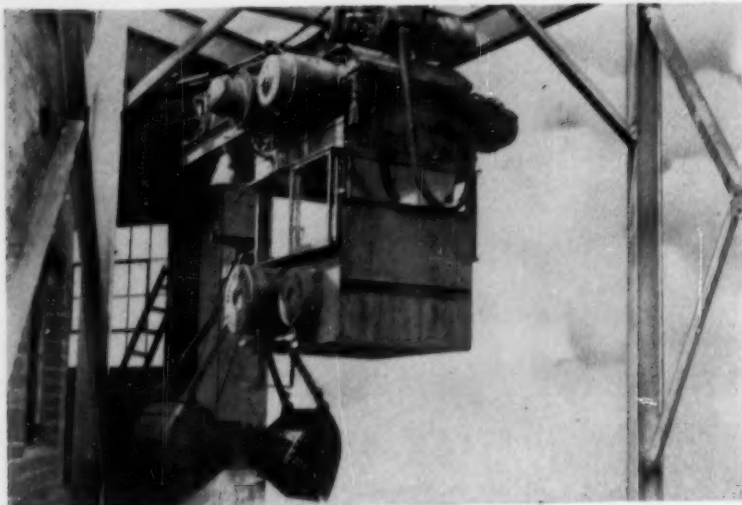
126 Dartmouth St., BOSTON 16, Mass., Commonwealth 6-0570 • 1209 Burlingame Ave., BURLINGAME, Calif., Diamond 2-0823 • 612 N. Michigan Ave., CHICAGO 11, Ill., Michigan 2-7407 • 857 Leader Bldg., CLEVELAND 14, Ohio, Superior 1-3235 • 3301 Walnut St., DENVER 5, Colo., Alpine 5-3984 • 202 Gonesse Bank Bldg., FLINT, Michigan, Cedar 8-6881 • 4301 Allerton Blvd., FORT WAYNE, Indiana, Eastbrook 2816 • 833 No. Capitol Ave., INDIANAPOLIS 4, Indiana, Melrose 5-2587 • 6440 Fleet St., LOS ANGELES 22, Calif., Raymond 3-3733 • 5107 Columbia Ave., ST. LOUIS 9, Mo., Prospect 1-1474 • 199 Main St., WHITE PLAINS, N. Y., White Plains 6-1354.

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## Monorail Hoist

**FAST  
SERVICE**

from point to point in your plant



## Materials Move Faster

... when they're sped through the air on a Shepard Niles Monorail Hoist! Because there are no obstacles in the way, like men or machines, to slow their travel down.

Shepard Niles offers you a complete line of hoists for constant or intermittent service. Available in light, medium and heavy duty equipped with either cab or floor controls. Choice of fast, medium or slow speeds.

Write for Monorail Hoist Bulletin ... and ask to have a Shepard Niles representative stop by your office. He'll assist you in selecting the hoist that best suits your plant.

America's Most Complete Line of Cranes and Hoists since 1903



### CRANES

Overhead: Top Running, Inner Running, Under Running, Floor or Cab Operated.

### HOISTS

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**SHEPARD NILES**  
CRANE AND HOIST CORPORATION

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Circle No. 157 on Reader Service Card for more information

## CATALOGS

*Continued*

**Scales** . . . Fairbanks-Morse and Company offers data on scales for automatic weighing.

Circle 65 on Reader Service Card

**Cranes** . . . Bulletin 80 from Whiting Corporation gives facts about engineered cranes.

Circle 184 on Reader Service Card

**Power Unit** . . . Information on a power unit designed to give added power to industrial trucks is offered by The Ready-Power Co.

Circle 147 on Reader Service Card

**Framing** . . . An idea brochure that contains full information on Dexion slotted angle may be obtained from Acme Steel Company.

Circle 20 on Reader Service Card

**Steel Strapping** . . . Allegheny Steelband Company offers to send information on solving difficult packaging problems.

Circle 10 on Reader Service Card

**Baskets** . . . Bulletin MS-52 offered by Wire & Iron Products, Inc. gives details on custom baskets and parts handling products.

Circle 188 on Reader Service Card

**Bag Packer** . . . How the Auger-matic valve bag packer shakes and settles as it weighs and fills is described in literature offered by E. D. Coddington Mfg. Co.

Circle 202 on Reader Service Card

**Bulk Handler** . . . Baughman Manufacturing Co., Inc. offers bulletin A-399 on the new Bulkmobile which has been designed to carry big loads at big savings.

Circle 30 on Reader Service Card



**"Longer tire life — reduced maintenance costs"**  
says International Terminal Operating Co.,  
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"We operate 400 lift-trucks in steam-ship terminal and stevedore service, and we depend on U. S. Royal Innacush Tires to keep our cost-per-hour down. They give longer tire life and, with their softer ride, reduce vehicle vibration and maintenance costs."

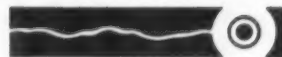
## Down Goes Your Cost-Per-Hour with this softer-riding tire!

According to large operators of lift trucks, cost-per-hour drops 'way down when they use U. S. Royal Industrial Tires.

One of the most popular of these tires is the U. S. Royal Innacush. It has an exclusive U. S. Royal dual-stock construction—tough on the outside for longer tread wear, soft on the inside for greater shock absorption.

As a result, the Innacush lasts far longer. And it provides much softer riding for your trucks, loads and drivers. Look at these two illustrations, representing the motion of a truck's axle across a rough

surface. The jagged line on top shows how an ordinary tire *conducts* shocks. The smooth line below shows how the U. S. Royal Innacush *sponges* shocks away.



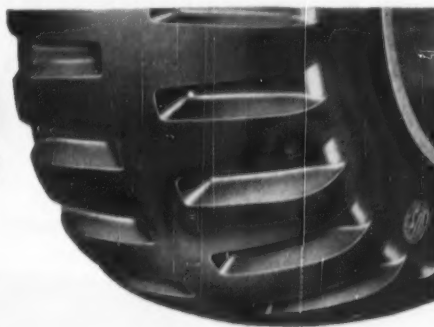
You can get the Innacush in 2 types—the regular pressed-on version or the new Demountable Innacush which can be changed in 10 minutes, avoiding expensive pressing and downtime. Either one will bring down *your* cost-per-hour!

# U.S. ROYAL

**INNACUSH** the original cushion solid



For further information, write Industrial Tire Dept.  
UNITED STATES RUBBER COMPANY  
ROCKEFELLER CENTER, NEW YORK 20, N. Y.



Circle No. 175 on Reader Service Card for more information

THE NEWEST AND BEST IN SHELVING!

# KLIP-BILT®

## STEEL SHELVING

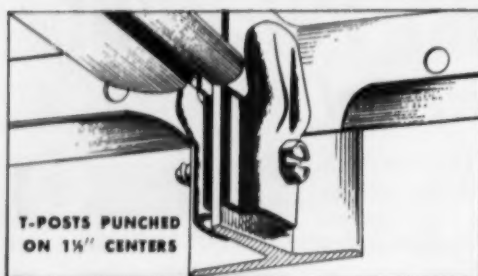
Pat. Pend.

installed fast without tools . . .  
combines high strength with  
low installation cost

KLIP-BILT, the revolutionary new boltless steel shelving, provides the fastest, simplest assembly of high strength storage equipment yet developed!

All fastening is with simple clips . . . easily installed by hand yet ingeniously designed to hold shelves, panels, dividers, and T-posts of various thicknesses pressure tight. Clips can be quickly disengaged, too, to permit easy rearrangement or disassembly of shelves.

Manufactured in standard sizes and parts.

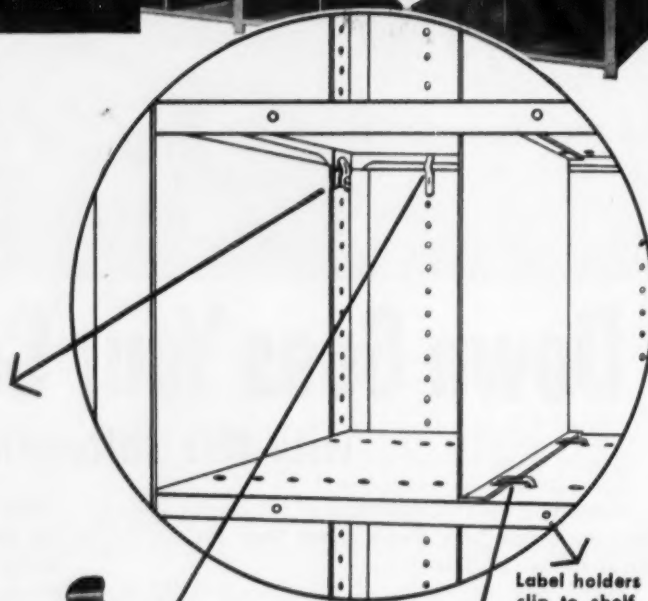
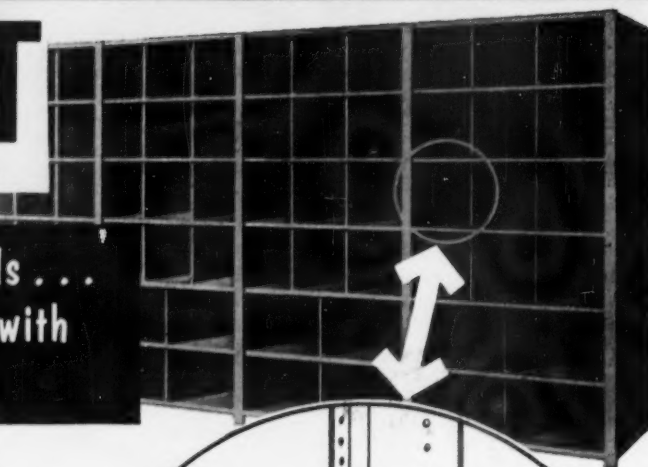


### SHELF CLIP

Just three parts for quick installation. Hardened cadmium-plated threaded stud and two heavy formed steel clips, one having stamped thread. Holds shelf flange tight against tough, rail steel T-post to prevent shelf from sagging when heavily loaded.

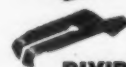
### A SHELF FOR EVERY LOAD

- A. For average loads
- B. For heavy loads  
(Front and rear flanges reinforced.)
- C. For extra heavy loads  
(Type B with sides and center reinforced.)



### PANEL CLIP

Secures back panels to shelf flanges. Engaged at each shelf level. Quickly and conveniently installed from in front of shelving.



### DIVIDER CLIP

Locks into two shelf holes to provide firm anchorage. Clips are flat, do not interfere with storage above or below shelf.

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WRITE FOR BULLETIN 701.

The FRICK-GALLAGHER MFG. CO.

115 E. MICHIGAN AVENUE, WESTLAWN, OHIO

Branch Office: 250 S. Broad St., Philadelphia 2, Pa.

Specialists in Storage Planning and Manufacturing  
of Storage Equipment





Five years ago, on the occasion of our twentieth anniversary in business, we ran the following editorial. It is just as true today as it was then. Changing the figure "20" to "25" gives you our story today EXCEPT that we have enjoyed five more years of building, five more years of health, five more years of God's blessings—for all of which we are truly thankful. We'll do our utmost in the next five years to maintain your respect and confidence.

# 25 years

The fact that our company is 25 years old this month is relatively unimportant to anyone except ourselves. Thousands upon thousands of other companies have become 25 years old, and much older. But to us, the important thing is the way in which this company started, and the way it has progressed these 25 years. Because only in America could this story have been written.

This company started on the ashes of a depression failure. Our first magazine, *INDUSTRY AND WELDING*, had 24 pages in each issue, of which 3, 4, 5, or 6 were advertising. At 3, 4, or 5 pages, we couldn't pay our printer, but with 6 we could just make it. Whether there were 3, 4, 5, or 6 pages of advertising at no time removed the personal necessity of eating, dressing, and traveling to get the 7th, 8th, and 9th page of advertising. Somehow, we muddled through. In America, you can do those things—with pride.

Many were the times when it looked as though we couldn't make it, and always, when it looked blackest, some miracle would happen and we'd be in business—for another month at least. We stuck. Friends were good to us. People had faith in what we were doing. You find that Americans like to help other Americans who are trying to help themselves. It is the essence of our country, of free enterprise.

No government questioned our right to be in business. No bureau told us what to print or how it should be said. We were free to make whatever profit we could manage and reinvest it in our own business or in any other way we saw fit. That, too, is the American way.

We chose to start magazines in other fields. No one told us what fields to start in or whether we could go into them. As long as we were willing to work and take the beating that every new, small business must take, we were permitted to build our own business in our own way.

These 25 years have been gratifying ones. It has been fun building a business. There's been a lot of hard work, long hours, and various worries, but we're glad we're in the publishing business, because we feel that we have contributed something to industry and to the general welfare of our country. We shall continue to do so. But again we say, **ONLY IN AMERICA COULD THIS STORY HAVE BEEN WRITTEN.** It is one of our great heritages which, unfortunately, we take for granted, and it's one worth keeping and worth fighting for.

*Irving B. Hexter*

Irving B. Hexter, President and Publisher

# Recommended Practices

FOR PLANNING, INSTALLING AND USING  
CONTINUOUS BELT CONVEYOR SCALES  
AND GRAVIMETRIC FEEDERS

## PART 1

## *Scales for Belt Conveyors*

**Recommendations from Weighing Equipment  
Manufacturers, in cooperation with the National  
Association of Scale Manufacturers, Inc.**

**W**EIGHING bulk materials "on the run", so to speak, is tremendously important to many companies. Motion weighing speeds up operations and thus is increasing in significance to industrial processing and movement of materials.

Something over a year ago, people of the conveyor and scale industries were talking about ways and means of improving performance of continuous belt conveyor scales and gravimetric feeders. These people, of course, knew of many installations where the maximum was not obtained from the equipment. As an aid, it was decided that weighing equipment manufacturers should develop recommendations for installation, operation and maintenance of belt conveyor scales and gravimetric feeders.

The two types of motion weighers discussed in the recommendations are (1) continuous belt conveyor scales and (2) gravimetric feeders.

Continuous belt conveyor scales are for weighing and totalizing materials as they move on a belt conveyor.

Gravimetric feeders automatically control, on a weight basis, the rate of feed of a continuous stream of material to a process.

The recommendations cover the numerous factors which affect the performance and accuracy of these

weighers. They include information which should be developed and supplied to the scale manufacturer for selection of the best type of weighing equipment for the application.

It is well known in the scale industry that the accuracy and reliability of continuous weighers and weigh feeders can be substantially improved by more careful attention to planning, installing and operating details. Obviously, it is to the advantage of the user to obtain the maximum benefits of his equipment by getting its best performance, consistent with good, economic practices and the requirements of the particular process.

We realize that not all installations will require the maximum efficiency and accuracy which can be obtained from the weighing equipment by following all of the recommendations. This, of course, will depend upon the cost element and whether the additional cost of a particular installation improvement is warranted to obtain the improved weighing performance.

### **Belt Conveyor Scales**

**A. Planning Before Installation:** The scale manufacturer should be furnished the following information, concerning the proposed installation, to select equipment most suitable to the requirements:

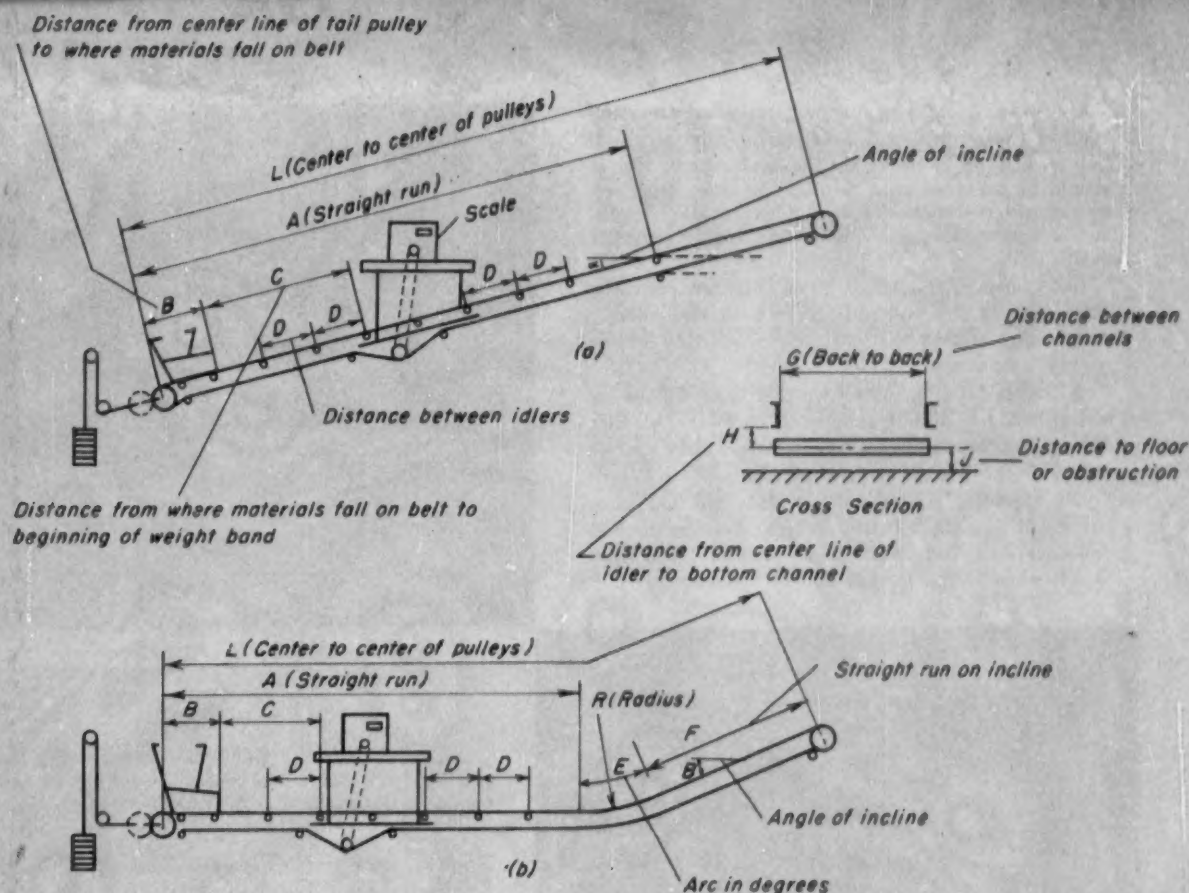


FIG. 1: Include installation dimensions; show location of drive and take-up and direction of travel.

### 1. General

(a) Available Electric Power: Voltage, cycles, phase; state whether frequency is regulated and whether equipment must be explosion-proof.

(b) Compressed Air Supply: Line pressure; state whether air supply is clean and dry.

(c) Application: State whether the process involves the mixing or blending of materials (other than those weighed by the conveyor scale) where rates must be controlled by the conveyor scale. Describe the feeding devices for these other materials.

(d) Conveyor-driven Equipment: Describe all auxiliary equipment powered directly by the conveyor belt.

### 2. Material Conveyed

(a) Physical Characteristics: Material name, specific weight in lb./cu.ft., maximum and minimum lump sizes, percentage of fines, temperature, tendency to adhere to the belt, tendency to roll or shift on belt while being conveyed, amount of free liquid on belt, angle of repose, moisture content, and whether or not material is hygroscopic.

(b) Capacity: Instantaneous peak load in pounds per running foot of belt, maximum and minimum rates

in tons per hour, average rate in tons per hour, duration of shortest run, uniformity of belt loading (if erratic, provide sketch of load profile along belt). Also, advise if belt is to run empty for long periods of time.

(c) Feeding Method: Describe, in detail, method of feeding conveyor belt (gravity flow from storage bin or pile, track hopper, grab bucket, screw or vibrator feed, etc.) and of controlling feed rate to the conveyor.

### 3. Conveyor

(a) Conveyor Drawings: Specify principal dimensions  
(More on next page)

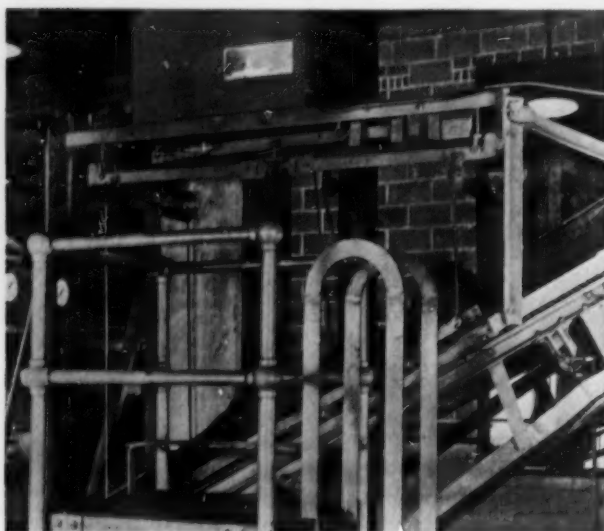
To prepare the "good practice recommendations", the National Association of Scale Manufacturers, Inc., enlisted the cooperation of the various manufacturers of these types of weighing equipment. In addition, we had the cooperation of the conveyor industry, and we acknowledge with thanks the contributions of Mr. R. C. Sollenberger, Executive Vice President of the Conveyor Equipment Manufacturers Association.

sions shown in Fig. 1, and show location of drive and take up arrangement and direction of material travel. Before a scale is ordered, the scale manufacturer should be provided with detailed conveyor cross-section drawings showing carry and return idler details, and a construction drawing of the entire conveyor length.

(b) Conveyor Location: State whether conveyor runs inside or outside buildings, or both, and whether daily temperature variations cause distortion of the conveyor structure.

(c) Scale Location: State whether scale will be installed inside a building or separate enclosure, whether this space is heated, and whether scale will be operating in a corrosive or dusty atmosphere.

(d) Conveyor Construction: State whether conveyor will be equipped with decking, describe the belt tensioner used, and state whether walkway is to right or left when facing in direction of material travel.



2

**WEIGHING ORE**, integrating scale with self-contained belt conveyor has no-load alarm device (at right).

1

**INCLINED 30 degrees**, conveyor weighs through scale and integrator (top) run by chain drive (rear).

**AUTOMATIC weighing and feeding of phosphate rock**, with control of screw conveyor (top) by scale unit.

5

#### 4. Conveyor Belt

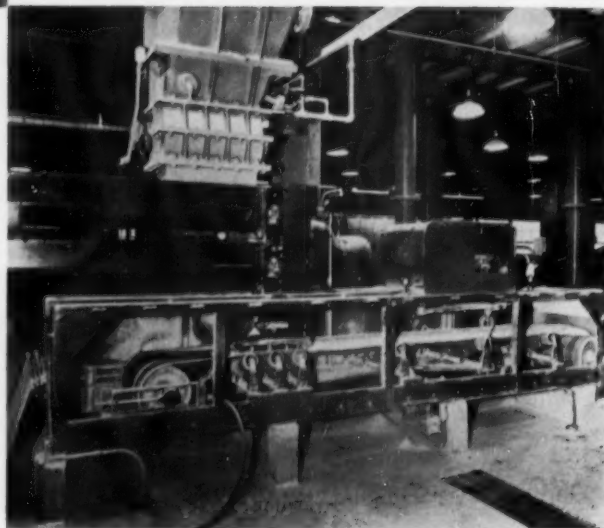
(a) Construction: State manufacturer's name and type number, width, total thickness, top cover thickness, bottom cover thickness, number of plies, weight of duck in ounces, and shape (flat or troughed).

(b) Installation: State belt speed, and, if variable, state the speed range; describe scraper or brush to be used.

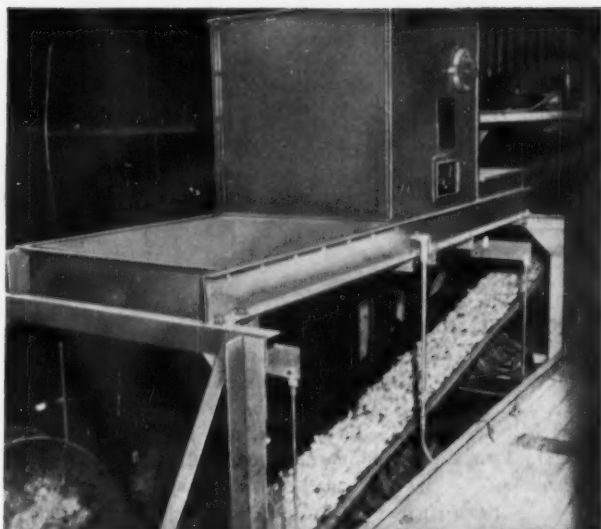
#### 5. Conveyor Idlers

(a) Carrying Idlers: State manufacturer's name and type designation, diameter, center-to-center spacing and whether flat or troughed.

(b) Return Idlers: State manufacturer's name and type designation, diameter and center-to-center spacing.



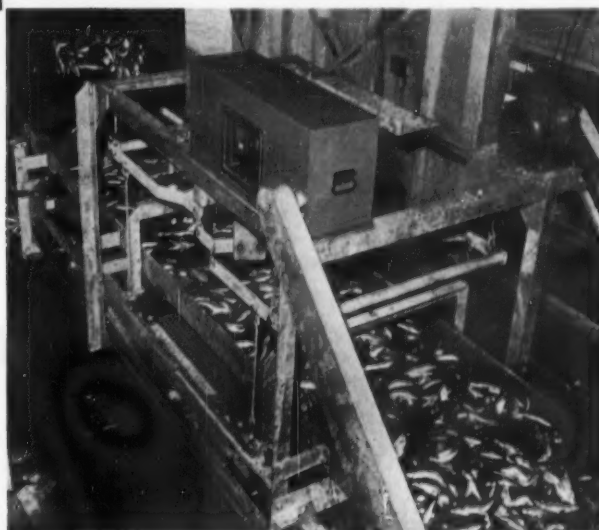




3  
FLOWING over scale section, wood chips are weighed on conveyor. Integrator and indicator are on top.

4  
CONTINUOUS weighing of fish conveyed from ship's hold to cannery at rates to some 130 tons per hour.

6  
CONTROLLING weight of materials feeding to furnaces is function of integrating scale in steel mill.



## 6. Instrumentation

(a) Accuracy: State accuracy required for shortest duration run and at minimum and maximum capacity of conveyor.

(b) Totalizer: State whether totalizer is to be mounted on left or right when facing in direction of material travel, what units totalizer should indicate (short, long or metric tons, pounds, barrels, etc.), whether chart recorder is required, and whether it is to be totalized or rate-of-flow type.

(c) Rate Controller: State whether required and, if so, describe equipment to be controlled, distance along belt from material feed-point to scale, and range of required control in percent of maximum rate.

(d) Remote Indication: State whether secondary totalizer and/or recorder are required, and state distance from scale to such remote units. State whether recorder is to be totalizing or rate-of-flow.

(e) Batch Counter: State whether batch counter is required to permit automatic delivery of pre-selected amount of material, and what maximum and minimum batch size limits will be required.

**B. Installation Requirements:** The following requirements represent good installation practice and should be followed if the user is to obtain desired performance.

### 1. General

(a) Foundations: The conveyor, scale and associated equipment should be rigidly mounted, preferably in concrete, so that a minimum vibration results from their operation.

(b) Structure: The conveyor and associated equip-

*(More on next page)*

ment should be so installed that they are reasonably free from distortion caused by daily temperature variations and the effects of sun and wind.

(c) **Vibration:** The scale should be so installed that vibration of other equipment, such as feeders, conveyors, mixers, etc., does not have an adverse effect on its operation.

(d) **Portability:** The belt conveyor scale should not be made portable unless special provisions are made to insure identical support at each weighing station.

(e) **Location of Scale:** The scale should be located as close to the loading end of the conveyor as practicable, but far enough from any point of curvature in the belt to avoid the effects of such curvature.

(f) **Access:** Adequate access should be provided for cleaning, lubrication and maintenance of the equipment as recommended by the manufacturer.

(g) **Calibration:** Means should be provided for calibrating the scale with test weights or special test chains as recommended by the manufacturer.

## 2. Material Conveyed

(a) **Capacity:** The user should not exceed the maximum rated capacity of the scale nor attempt to weigh at less than the minimum rated belt loading in pounds per foot, as either condition will cause inaccurate results.

(b) **Lump Size:** The more uniform the material, the better the weighing accuracy; material containing heavy lumps out of proportion to the rest of the material cannot be accurately weighed.

(c) **Temperature:** The temperature of the material on the conveyor belt should not exceed the limits specified by the belt manufacturer.

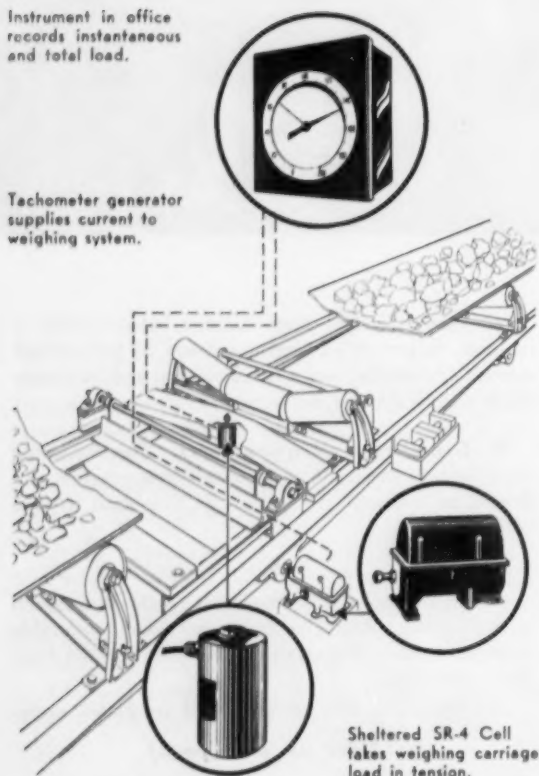
(d) **Stickiness:** The material should be prevented from building up on the circumference of the belt speed pick-up roller. There should be no free liquid on the belt of an inclined conveyor, nor should the material be permitted to hinder the free rotation of the idler rollers.

*(Continued on page 104)*

# Electrical Weighing Simplifies Control of Shipments

Instrument in office records instantaneous and total load.

Tachometer generator supplies current to weighing system.



Sheltered SR-4 Cell takes weighing carriage load in tension.

**C**ONTINUOUS measurements of shipments and production are provided by electrical weighing at The Valley Camp Coal Company's mine in Moundsville, W. Va. Coal is weighed electrically by a new system incorporating a 300-pound capacity SR-4 load cell, which is located between the tippie and barges on the Ohio River.

A counter-balanced weighing carriage is supported under the belt by a pivot shaft. On one end of the carriage is a floating roller; on the other end is a counter-weight. Downward movement of the floating roller is restrained by the load cell, which is sheltered and under the center of the belt so that it takes the carriage load in tension. Belt speed enters into the continuous weighing by means of an electric tachometer generator, which is driven by the return side of the belt. Weight measurements are transmitted to an instrument in the mine office having a large dial indicator which shows instantaneous rates of flow on the belt in tons per hour, a continuous circular chart record of flow rates, and a total count of tonnage carried to barges.

(For operating principles of the SR-4 load cell, see FLOW for August '55, "How Load-Cell Weighing Works".) Another totalizing counter at the operator's position on the dock adds to the convenience of the method, which is said also to provide customers greater reliance on bills of lading than those determined by water displacement of barges.



# Integrating the Crane into Automatic Handling Systems

By R. W. Roberts, Whiting Corp.  
and  
James Simkins, Cullen-Friedstedt Co.

**T**HE TREND toward more extensive mechanization—or “automation”, as it is becoming commonly called—is definitely forcing changes, including better integration of plants and equipment.

The fundamentals upon which such changes must be based have been proven by time. It is these principles that must be faithfully observed, in combination with each other, to effect good plant operation.

There is nothing new about them. They include sound production control, inventory control, labor control, and quality control; good plant layout; efficient material handling; modern manufacturing methods applied to a properly engineered product, and that's about all. They are basic—as basic to successful plant operation as the Constitution is to the Government of the United States.

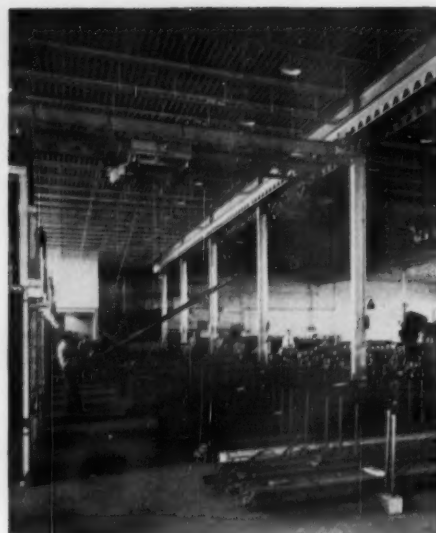
It is, therefore, essential that plant operating men, particularly the material handling engineers, be completely realistic and not lose sight of these fundamental factors, which are essential to a smooth-working, efficient and dependable operation. This applies to all types of material handling, including that by overhead equipment.

Overhead material handling covers a large segment of the material handling field. Besides the overhead traveling crane, it includes many types of conveyors, such as the chain, belt, roller, and cable conveyor. Overhead material handling has even gone into the office, where pneumatic conveyors, among others, are used for handling paper work. Other examples are the ore bridges used in the unloading of ore and coal

*(More on next page)*



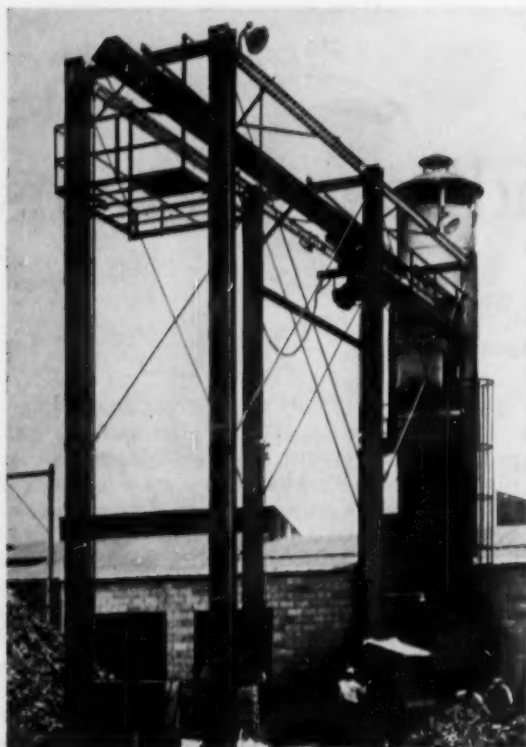
**YARD CRANE**, in Regular Industrial Service, has 15-ton capacity, 50-foot span, and is cab-controlled.



**DOUBLE** girder cranes in each of 3 bays provide complete coverage in Detroit warehouse.

## INTEGRATING THE CRANE

*Continued*



**CONTINUOUS** Material Handling Crane provides high efficiency in foundry with precision controlled lift of cone-bottom charging bucket into cupola.

carriers at the docks, stiff leg cranes, spout hoist jib cranes, pillar cranes, revolving jib cranes, wall bracket cranes, and a great many others.

### Three Types of Overhead Cranes

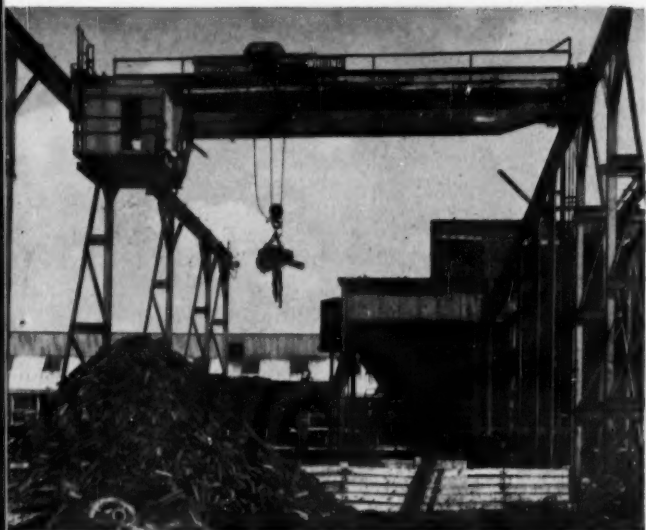
This discussion, however, will cover three specific types of overhead cranes: (1) the top-running overhead electric and hand-gear crane; (2) the gantry crane; and (3) the underhung type of crane and monorail system. Capacities of these cranes range from 500 pounds to 500 tons. They comprise a broad phase of material handling equipment.

In these days of great pressure and haste, it is often quite evident that too much time has been devoted to technical details of construction of the crane—and that not enough time has been spent in planning the use which will be made of the crane in relation to the overall production of the plant.

In the selection of a crane it is important that basic factors regarding its use be given thorough consideration ahead of the details of construction. These factors are briefly:

1. Materials to be handled.
2. Equipment to be serviced.
3. Flow of materials.
4. Weight of lifts and number of lifts.
5. Building areas and railroad sidings.
6. Building heights and construction.
7. Crane capacity and number of cranes.
8. Height of lift and distance to be traveled.
9. Operating speeds.
10. Floor or cab control.





**MAGNET** equipped Material Handling Crane in foundry yard unloads pig and scrap, supplies charges.

If these factors are carefully analyzed, the requirement of the crane for any given application will become apparent, and then the details of construction can be determined.

#### **Cranes are Production "Tools"**

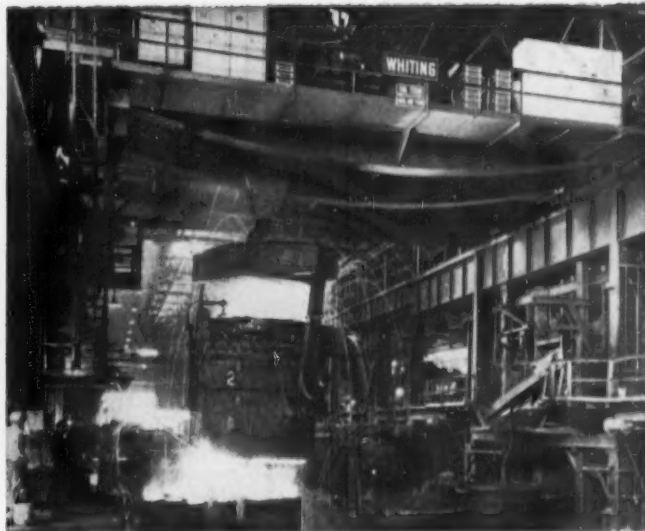
The progressive planning engineer has come to realize that, in many plants, overhead traveling cranes have ceased to be merely handling devices; they have become integral tools of production equipment on which whole departments and plants are dependent for their rate of production. They are part of "automation." This leads to the growing conviction that cranes should be bought to perform a specific job rather than as part of a building project; that special purpose applications may change, of necessity, with changes in production requirements; and that, when they do, cranes must be changed also.

Let us consider what a crane is. It consists of: (1) a runway on which to traverse the length of the building bay; (2) a bridge to span the width of the bay and to travel back and forth over the length of the runway; (3) a trolley or carrier for traversing the width of the bay across the bridge; and (4) a hoist mounted on the trolley or carrier for raising or lowering the load.

#### **Top-Running Overhead Cranes**

Let us discuss the top-running overhead crane first. The crane industry generally divides this type into five different classes.

**Class 1. Standby Cranes:** These are used for maintenance service over machinery which has parts too large to handle manually but which requires removal from the machine at periodic intervals for service and maintenance. They are also used in maintenance shops, machine shops, receiving docks, where



**STEEL** mill cranes have high safety, long-life factors to provide for overloading, minimize maintenance.

service is light, or in any other location where lifts are infrequent and speed in handling is not important.

Many times these cranes are completely hand powered. That is to say, the hoisting motion as well as the crane travel and trolley travel are all operated

*(More on next page)*



**FROM FINAL ASSEMBLY,** jet engines at Westinghouse are packed in containers and delivered to shipping by Intermittent Industrial Service Crane.



WEIGHING and handling are simultaneous in rubber belting plant using floor-controlled 15-ton crane with 34 ft. 8 in. span. This is a Class 2 top-running crane.



LIFTERS, motor operated, handle trays for storage of various types and sizes of aluminum sheet and plate in aircraft plant warehouse "covered" by cranes.

## INTEGRATING THE CRANE

*Continued*

through hand chains which extend from the crane itself to a convenient distance from the floor.

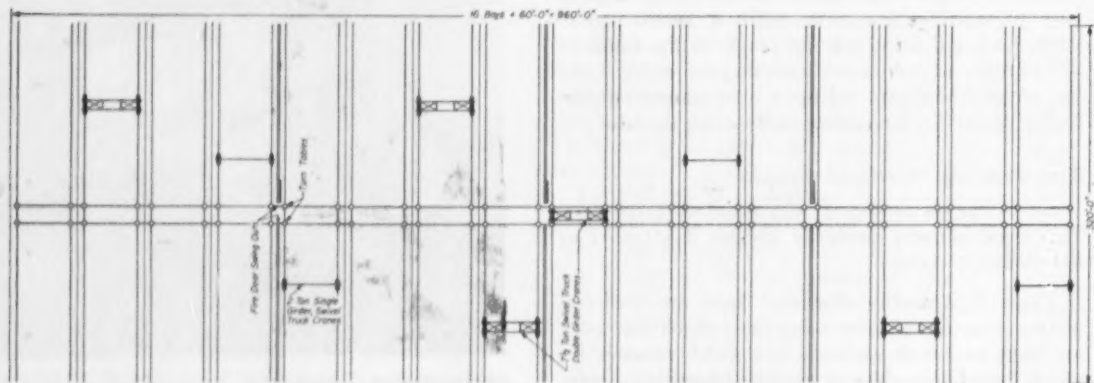
These cranes vary in capacity from one ton to 50 tons. With the trend in industry toward less fatiguing work conditions, the hoist motion is usually motorized and often the other motions are controlled from a pendant push-button station by the operator on the floor. These cranes may also be cab operated.

**Class 2. Intermittent Industrial Service Cranes:** This covers floor- or cage-operated cranes that are not in constant use and usually have no specific person employed to operate them exclusively. This type of crane may be idle for long periods, and at times it may be used fairly constantly.

Generally, these cranes are not expected to perform more than 10 to 15 lifts and the accompanying other operations in an hour. Operating speeds are usually slow.

**Class 3. Regular Industrial Service Cranes:** This covers a broad field of cage-operated cranes which are used at intervals frequent enough to require the full-time employment of a regular crane operator. This crane usually includes a minimum safety factor of 5 in all parts.

Operating speeds are faster than for the Class 2 cranes and depend to a large extent on the job which the crane is going to be required to perform. This crane handles up to 30 or 40 loads per hour.



CRISS-CROSS COVERAGE is obtained with system which includes rotating power trolleys, interlocking

turntables operating through door openings of vertical-lift automatic fire doors.



IN SEQUENCE, lifter above deposits three packs of sheet aluminum; right, it has picked up two top packs, is in traveling position for delivery to machine.



#### ***Class 4. Continuous Material Handling Cranes:***

This covers cranes which are operating constantly. Bucket cranes handling cement, fertilizer, crushed stone, sand or coal are examples of this type. Also included are some magnet handling cranes in yards and warehouses, where the service is of a nature requiring the crane to be on the move at all times.

This class must be of rugged construction, have a high factor of safety and also a long-life factor in all of its parts. Motors and controls for these cranes must be carefully selected for the duty cycle which the crane must perform. Speeds of operation are usually very high in comparison with those of other classes.

***Class 5. Steel Mill Cranes:*** These cranes are classified by themselves, are used in the production of steel and in other similar operations where the duty is extremely severe. They generally operate 24 hours per day, seven days per week, the year around.

High factors of safety are designed into all parts to provide for the overloading that frequently occurs in steel mill production. The cranes also must have a long-life factor so as to reduce down time for maintenance to a minimum.

#### **Gantry Cranes**

The gantry can fall into any one of the categories. It has two main types—double-leg and single-leg.

The double-leg gantry is supported by two legs with two rails usually laid on a foundation at ground level. The legs support the bridge structure and are high enough to provide clearance for whatever materials are to be handled.

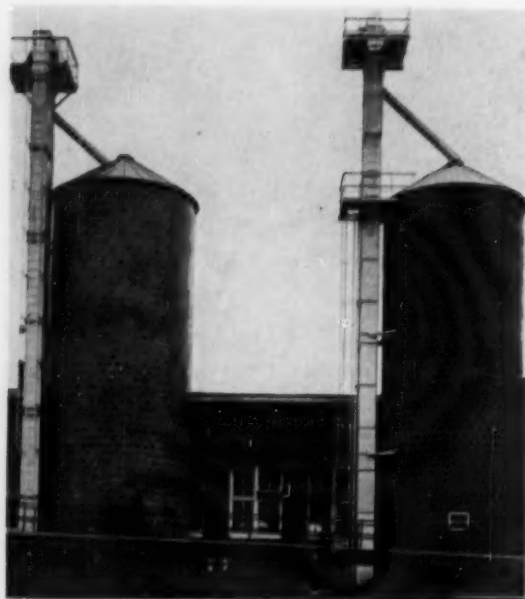
The single-leg gantry is just what the name implies. It has but one leg, with the other end truck of the bridge structure being supported on a building wall.

Both type gantries are often used in outside service over a yard area, or as service equipment on a dam for



SKIDDED PACKS of aluminum plate go into storage. Deep carrying angle of lifter accommodates large load. Design allows use in extremely narrow aisles.

(Continued on page 106)



TODAY'S equipment fits today's requirements, obsoletes ideas about 24-hour bunkers.

# Handling Coal and Ash *in a Smaller Plant?*

Here are some suggestions for mechanizing stock-piling, feeding and ash removal—systems which have proved successful for plants using 200 to 30,000 tons annually.

By D. A. Given and C. A. Marshall,  
Fairmont Coal Bureau, New York, N. Y.

**D**EMAND for greater mechanization of small boiler plants has substantially raised the performance standards for coal- and ash-handling systems in the past few years. As a result, much attention is being focused on the limitations of existing installations and how they might be modified to provide more acceptable performance.

Designers of new plants are likewise finding it necessary to take a greater interest in such factors as eliminating dust and providing higher dependability of handling equipment. The need to control capital investment in relation to the size of plant imposes some restrictions to the types of equipment which may be considered but, in effect, helps to simplify the problem of selecting a satisfactory design.

This discussion takes up some of the more important design considerations for plants requiring from 200 to 30,000 tons of annual coal consumption. Corresponding steam loads range as high as 150,000 lb. per hr. All have one thing in common. They can be adequately mechanized for one-man operation—assuming, of course, that another man is available for unloading cars in cases where the coal is received by rail.

## Controlling Labor Requirements

The operator of a one-man boiler plant has a number of important responsibilities and must not be burdened with any material handling problems that will require him to neglect his other duties. Some manual work of a routine nature is permissible in the smallest plants, but the need for special procedures in the event of equipment failure are very distracting in any size of plant. The operator will usually require assistance in such emergencies, and often this can result in the assignment of additional full-time operators to the boiler plant.

Another important consideration is the use of adequately sized storage bins to avoid the necessity for dumping coal on the ground—and later reclaiming it in the event deliveries get a little off schedule. Even more obvious is the need to provide for control of the handling systems entirely from the operating floor, wherever practicable. Basement ash-handling systems or overhead bunkers which require trimming can hardly be accommodated in a one-man plant. Dustless operation is important for attracting competent operating personnel.



The car-unloading operation should be arranged in such a way as to require no more than 10 or 15 man-hours of labor per week, whereby unloading capacity will be adequate to accommodate any bunching of railroad cars. This will eliminate the need for more than one man to unload cars. It offers a certain opportunity in plants using as little as two or three cars per week to obtain this man's services on a part-time basis. Portable car thawers selling for less than \$300 are recommended for plant locations subject to freezing weather. In addition, plants using more than 8000 or 10,000 tons of coal annually should be equipped with a light-duty car shaker at a cost of approximately \$1,800, complete with jib crane and hoist.

### Economic Considerations

All items of expense for handling coal and ashes can be conveniently related to a unit-cost-per-ton of annual coal consumption. Thus, one \$3,600 man for unloading cars in a 15,000 ton-per-year plant produces a labor cost of 24 cents per ton of coal burned. Power and maintenance charges of \$1,500 per year would add another 10 cents per ton. Fixed charges on a capital

investment of \$50,000 in handling systems for this plant would be equivalent to 50 cents per ton of coal, based on the usual fixed-charge rate of 15 percent.

Comparable unit costs can be achieved throughout the range of plant sizes here considered. Combined investment costs for coal- and ash-handling systems can normally be controlled to between \$3.00 and \$4.00 per ton of annual coal consumption. Labor charges for the man unloading cars vary with plant size from about 12 to 50 cents per ton, the latter figure applying to the use of a full-time coal handler in a 7200 ton-per-year plant.

### General Specifications

Handling systems here described are composed of standard units available from a number of different manufacturers. However, unless adequate specifications are provided, the plant designer has no assurance that all of the bidders will have correctly interpreted his requirements as to types and sizes of equipment, metal thickness and conveyor speeds.

Equipment capacities are readily established on the basis of burning rates and estimated coal-delivery schedules. With rail deliveries, it is usually assumed that as much as a four-day supply of coal may arrive on one day. Thus a storage bin to accommodate a one-week supply, or not less than 100 tons, will be ample to avoid the need for dumping coal on the ground. Conveyors from the truck to the bin should be adequate to unload a four-day supply of coal in eight-hours, again with a minimum of 25 tons-per-hour. The conveyors from the bin to the stokers are normally sized at 150 to 200 percent of the maximum firing rate.

With truck deliveries, a somewhat lower bunching factor may be used in establishing bin capacities. By the same token, plants burning as much as 8 or 10 carloads of coal per week may not be affected as much by car bunching as the smaller rail-delivery plants. In

*(More on next page)*

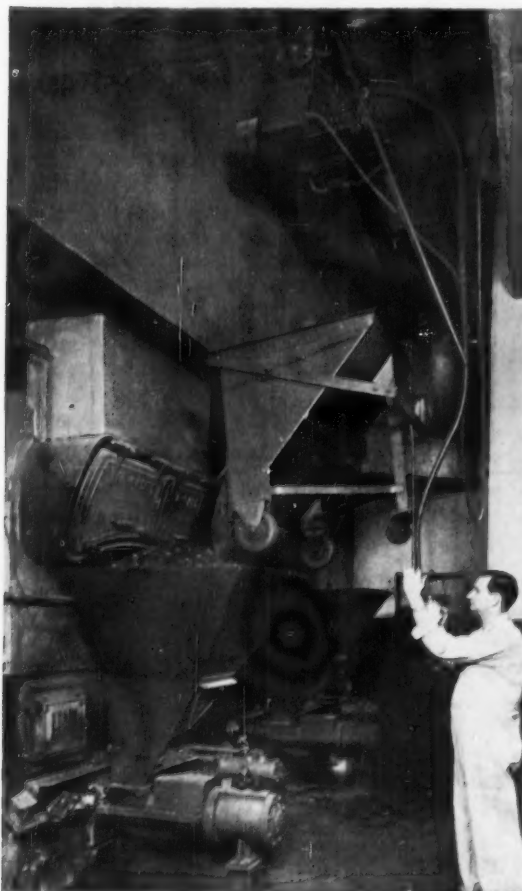


FIG. 1: Wheel mounted bucket, electric hoist and monorail fill this four-hour-capacity stoker hopper.

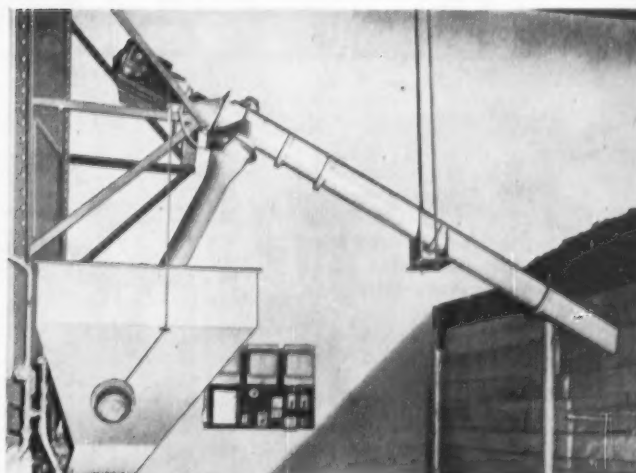


FIG. 2: Screw conveyor loads hopper automatically from bin at Cooper Tire & Rubber Co., Findlay, Ohio.

FIG. 3: System for handling an average of 200 tons per week incorporates track hopper, bucket elevator, silo and screw feeder-conveyor.

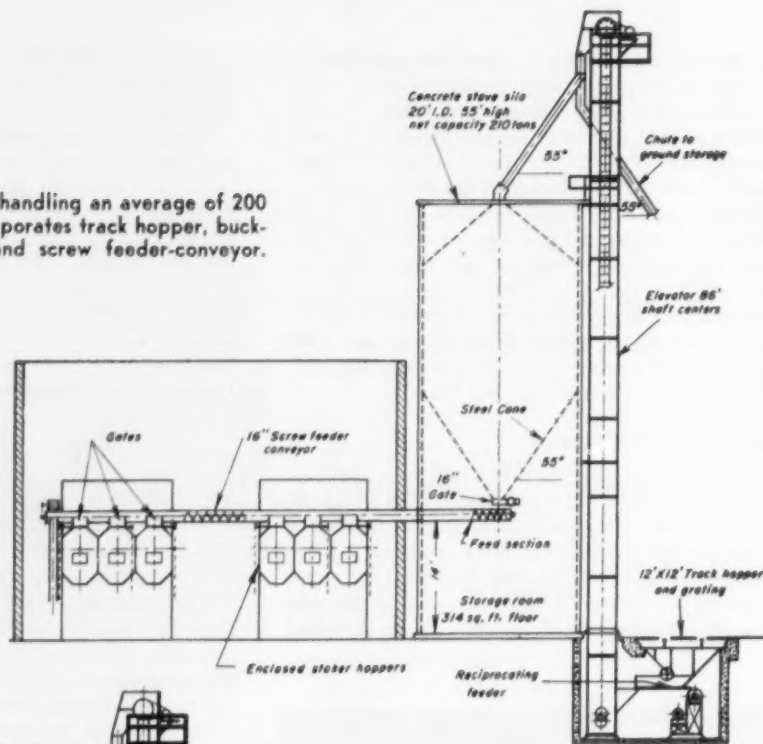


FIG. 4: With lower capacity than above system, this utilizes portable unloader and conveyor to feed elevator and a flight conveyor to unload from silo.

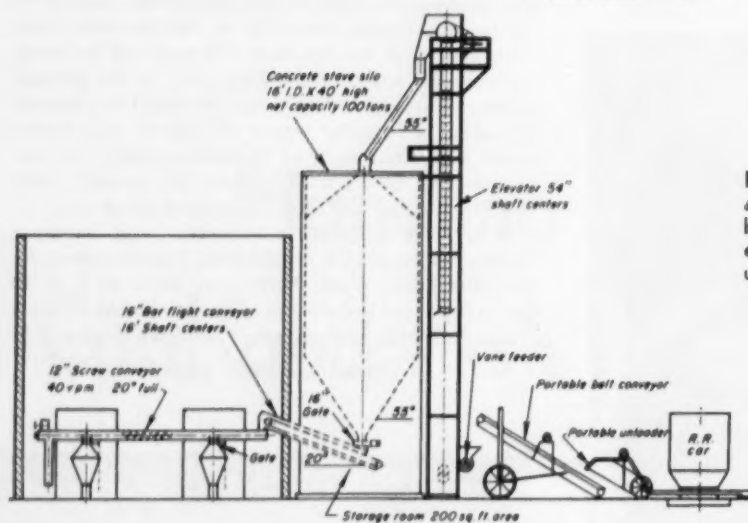
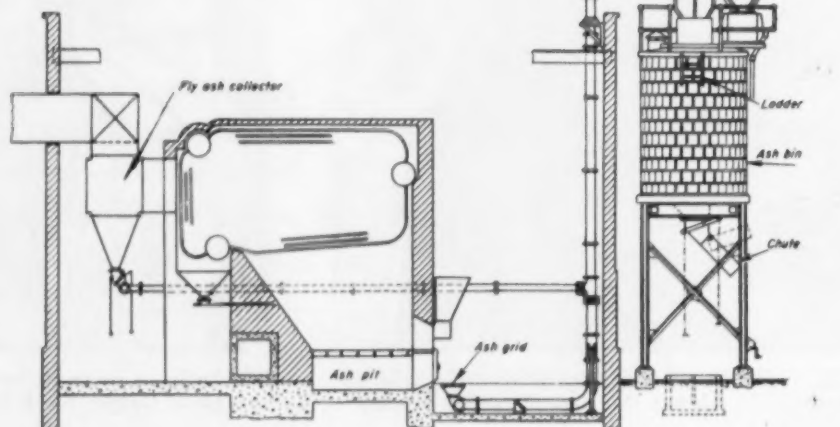


FIG. 5: Pneumatic handling of ash and fly ash provides dust-free operation, eliminates using basement, extra men.



such cases, a storage-bin capacity for a three- or four-day supply of coal may be adequate.

Traditional ideas about using only 24-hour bunkers are obviously unsuited to modern requirements. It is also undesirable to store more coal in the bin than necessary to meet the above requirements because of the danger of spontaneous combustion. Unless the coal has been double screened to remove the fine sizes, it is recommended that it not be left undisturbed in a bin for more than a few weeks. Some coals will catch fire more quickly than others, but the design of the handling system should not limit the coal selection for the plant.

A reserve supply of coal for use in emergencies should be stored on the ground where a 45-day emergency supply is considered adequate protection in accordance with national averages for coal stockpiles.

#### Plants Burning Less than 5000 Tons Per Year

Because ash quantities average only 10 to 12 percent of coal quantities, there is little need for automatic ash handling in the plants burning less than 5000 tons per year. At the end of each shift, the fireman can shovel the ashes into covered cans for subsequent removal by truck. An electric chain hoist will suffice for elevating the cans to a truck.

Coal handling, however, should be mechanized not only because of the filling of stoker hoppers by hand would be an almost continuous operation. Figures 1 and 2 show two inexpensive methods of mechanizing these plants. The wheel-mounted bucket and monorail arrangement for hoisting the bucket over the stoker hoppers is simple and relatively fool proof. Using an

oversized stoker hopper for a four-hour coal supply makes this an excellent application for a smaller installation where the janitor doubles as the fireman. A lift truck or a front-end loader would accomplish the same purpose. The bin-feed conveyor or a bin-feed stoker can be installed to keep the stoker hoppers filled automatically.

In all of these cases, the coal bin is normally constructed as an extra room adjacent to the boiler room. Chutes or inexpensive portable conveyors suffice for filling the bin regardless of whether the coal is received by truck or by rail.

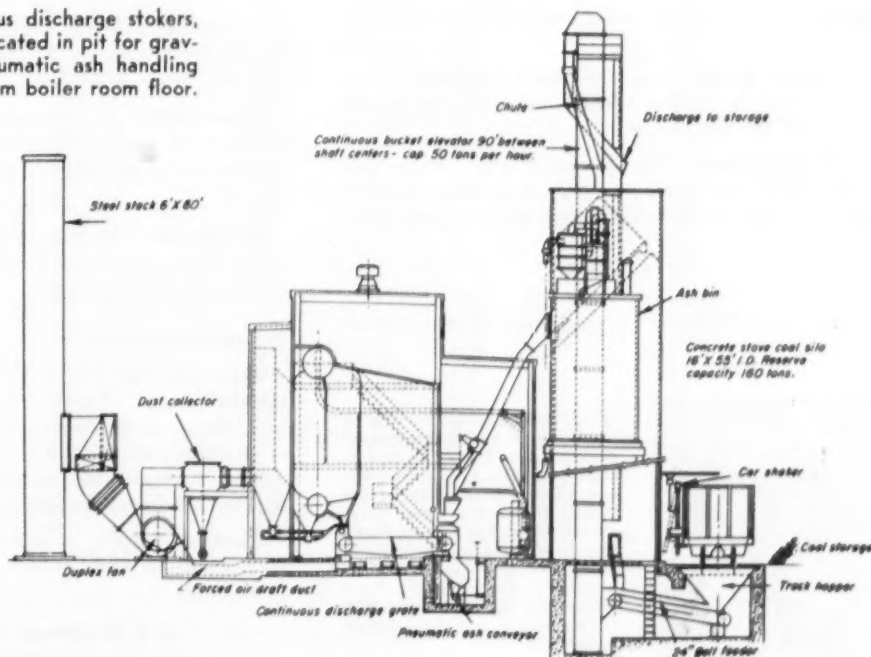
#### Plants Burning More Than 5000 Tons Per Year

Most of the plants in this category are of the industrial type involving process as well as heating loads. The use of low-cost slack sizes of coal is more common, as is the use of stokers which produce a finer size of ash. Increased percentages of fines necessitate more careful attention to factors affecting the flow of materials and spontaneous fires. If spreader stokers are involved, the ash and fly ash can only be handled satisfactorily with pneumatic or possibly sluicing systems.

Figures 3 and 4 show two recommended arrangements for coal-handling systems. Both are designed around a concrete-stave silo with conical bottom discharging to inexpensive screw or bar-flight conveyors. A bucket elevator is used for the silo-filling conveyor, and this is fed either from a track hopper or portable conveyors. Various other types of units could be used but usually at somewhat higher capital cost.

(Continued on page 114)

FIG. 6: For continuous discharge stokers, ash hoppers can be located in pit for gravity discharge to pneumatic ash handling system, controlled from boiler room floor.



# New Industrial Wheel Standards

**C**ULMINATION of nearly three years of painstaking work, the industrial wheel standards developed by the chairman and members of the Wheel Standards Task Committee of the Caster and Floor Truck Manufacturers' Association now have been approved.

These standards, which cover molded-on, metal and plastic wheels, were developed primarily to simplify selection and reduce inventories. Here are the complete standards, as approved by Association members:

## Molded-On Industrial Wheels

These wheels, also known as **Cured-on Industrial Wheels, Rubber-Tired Industrial Wheels, and Vulcanized-on Rubber Tired Wheels**, can be used on four-wheel hand powered industrial trucks, four-wheel trailer-type industrial trucks, two-wheel hand trucks, casters, conveyors, or for any type of industrial or movable equipment wherein loads and speeds are within the specified limits.

## Definitions

**Load Rating:** The maximum operational load to be applied to each wheel under maximum recommended speed.

**Impact Load:** A sudden shock resulting from a momentary or extreme exertion when coming in contact with any obstruction.

**Starting Load:** The force in pounds drawbar pull required to start in motion from a standing position, a wheel, truck or other equipment under a given static load.



W. J. DAUGHERTY, who is manager of the Development Department, Firestone Industrial Products Company, Akron, Ohio, is chairman of the Wheel Standards Task Committee of the Caster and Floor Truck Manufacturers' Association. He was highly instrumental in developing these standards, together with other Committee and Association members.

**Sustaining Load:** The force drawbar pull required to keep the wheel or equipment in motion under a given load. The sustaining load, using a good rubber compound, should be approximately 20-25 percent lower in drawbar pull than the starting load.

**Tread Width:** Width at the base of the rubber tread.

**Wheel Diameter:** Diameter determined by the extreme height or outside of the molded rubber tread.

**Tensile Strength:** The force per unit of the original cross-sectional area which is applied at the time of the rupture of a specimen. It is calculated by dividing the breaking force in pounds by the cross-section of the unstressed specimen in square inches.

**Elongation:** Increase in length expressed numerically as a fraction or percentage of initial length.

**Permanent Set:** The residual unrecoverable deformation remaining after a specimen has been stressed in compression under a specific static load for a definite period and released for a definite period (ASTM standards).

**Adhesion:** Holding quality of the tread measured by the force required to separate the rubber tread from its base or wheel rim.

**Durometer:** An instrument for measuring the hardness of rubber. Measures the resistance to the penetration of an indenter point into the surface of rubber.

**Resilience:** The ratio of energy given up on recovery from deformation to the energy required to produce the deformation.

## Wheel Requirements

**Construction:** The metal wheel casting or stamping shall consist of a good grade of semi-steel, malleable, aluminum, or sheet steel, and shall be so designed to give sufficient strength to resist shock impacts with a good factor of safety, in accordance to the specification for maximum operational load rating and speed.

**Bearings:** Roller or ball bearings are to be made from hardened alloy rollers or balls with hardened outer races.

*(Text continued on page 128,  
Tables on following three pages)*



## Dimensional Standards for Molded-On Industrial Wheels

(Roller or Ball-Bearing Equipped)  
For Nonpowered Material Handling Equipment

Wheel Diam. & Width of Base, Inches	Maximum Core and Rim Width, Inches	Overall Hub Length, Inches	Inside Diam. of Bearing or Axle Diam. inches	Maximum Operational Load, Pounds, 10 mph Intermittent
4 x 1 1/2	2 3/4 x 1 1/2	1 5/8	1/2	200
4 x 1 1/2	2 3/4 x 1 1/2	1 5/8	5/8	200
5 x 1 1/2	3 3/4 x 1 1/2	1 5/8	5/8	240
5 x 1 1/2	3 3/4 x 1 1/2	1 5/8	3/4	240
5 x 2	3 3/4 x 2	2 1/4	5/8	350
5 x 2	3 3/4 x 2	2 1/4	3/4	350
6 x 1 1/2	4 9/16 x 1 1/2	1 5/8	5/8	280
6 x 1 1/2	4 9/16 x 1 1/2	1 5/8	3/4	280
6 x 2	4 1/4 x 2	2 1/4	3/4	410
6 x 3	4 9/16 x 3	3 3/4	1	680
6 x 3	4 9/16 x 3	3 3/4	1 1/4	680
8 x 2	6 1/4 x 2	2 1/4	3/4	500
8 x 2	6 1/4 x 2	2 1/4	7/8	500
8 x 2	6 1/4 x 2	2 1/4	1	500
8 x 2 1/2	6 1/4 x 2 1/2	2 3/4	1	670
8 x 2 1/2	6 1/4 x 2 1/2	2 3/4	1 1/4	670
8 x 2 1/2	6 1/4 x 2 1/2	3 1/4	1	670
8 x 3	6 x 3	3 3/4	1	840
8 x 3	6 x 3	3 1/4	1 1/4	840
10 x 2 1/2	8 x 2 1/2	2 3/4	1	790
10 x 2 1/2	8 x 2 1/2	2 3/4	1 1/8	790
10 x 2 1/2	8 x 2 1/2	2 3/4	1 1/4	790
10 x 2 1/2	8 x 2 1/2	3 1/4	1	790
10 x 3	8 x 3	3 1/4	1	1000
10 x 3	8 x 3	3 1/4	1 1/4	1000
10 x 4	8 x 4	4 1/4	1 1/4	1400
12 x 2 1/2	10 x 2 1/2	2 3/4	1	900
12 x 2 1/2	10 x 2 1/2	2 3/4	1 1/4	900
12 x 3	10 x 3	3 1/4	1	1140
12 x 3	10 x 3	3 1/4	1 1/4	1140
12 x 3 1/2	10 x 3 1/2	4 1/4	1 1/4	1370
12 x 4	10 x 4	4 1/4	1 1/4	1600
12 x 5	10 x 5	5 1/4	1 1/4	2050
14 x 3	12 x 3	3 1/4	1	1280
14 x 3	12 x 3	3 1/4	1 1/4	1280
16 x 3	14 x 3	4 1/4	1 1/4	1420
16 x 4	14 x 4	4 1/4	1 1/4	1990
16 x 5	14 x 5	5 1/4	1 3/8	2570
16 x 5	14 x 5	5 1/4	1 1/2	2570
18 x 3	16 x 3	4 1/4	1 1/4	1550
18 x 5	16 x 5	5 1/4	1 3/8	2800
18 x 5	16 x 5	5 1/4	1 1/2	2800
20 x 3	18 x 3	3 1/4	1 1/4	1680
20 x 5	18 x 5	5 1/4	1 1/2	3020
20 x 5	18 x 5	5 1/4	1 3/4	3020
28 x 4	25 13/16 x 4	6	1 3/8	3050

Note: Decrease the above load ratings 15% when tires are used on power driven vehicles.

The above load ratings are predicted on Tire and Rim Association Standards.

## Dimensional Standards for Metal Industrial Wheels

(Roller or Ball-Bearing Equipped)  
For Nonpowered Material Handling Equipment

Wheel Diam. & Rim Width Inches	Overall Hub Length Inches	Inside Diam. of Bearing or Axle Diam. Inches	Maximum Operational Load, Pounds, 4 mph Continuous, 10 mph Intermittent
4 x 1 1/2	1 5/8	1/2	425
4 x 1 1/2	1 5/8	5/8	425
4 x 2	2 1/4	3/4	500
5 x 1 1/2	1 5/8	5/8	500
5 x 1 1/2	1 5/8	3/4	500
5 x 2	2 1/4	3/4	575
6 x 1 1/2	1 5/8	5/8	575
6 x 1 1/2	1 5/8	3/4	575
6 x 2	2 1/4	3/4	850
6 x 3	3 1/4	1	1425
6 x 3	3 1/4	1 1/4	1425
8 x 2	2 1/4	3/4	1050
8 x 2	2 1/4	7/8	1050
8 x 2	2 1/4	1	1050
8 x 2 1/2	2 3/4	1	1400
8 x 2 1/2	2 3/4	1 1/4	1400
8 x 2 1/2	3 1/4	1	1750
8 x 3	3 1/4	1	1750
8 x 3	3 1/4	1 1/4	1750
10 x 2 1/2	2 3/4	1	1650
10 x 2 1/2	2 3/4	1 1/8	1650
10 x 2 1/2	2 3/4	1 1/4	1650
10 x 2 1/2	3 1/4	1	1650
10 x 3	3 1/4	1	2075
10 x 3	3 1/4	1 1/4	2075
10 x 4	4 1/4	1 1/4	2930
12 x 2 1/2	2 3/4	1	1700
12 x 2 1/2	2 3/4	1 1/4	1700
12 x 3	3 1/4	1	2100
12 x 3	3 1/4	1 1/4	2100
12 x 3 1/2	4 1/4	1 1/4	2280
12 x 4	4 1/4	1 1/4	2660
12 x 5	5 1/4	1 1/4	4100
14 x 3	3 1/4	1	2140
14 x 3	3 1/4	1 1/4	2140
16 x 3	4 1/4	1 1/4	2360
16 x 4	4 1/4	1 1/4	3320
16 x 5	5 1/4	1 3/8-1 1/2	5140
18 x 3	4 1/4	1 1/4	1935
18 x 5	5 1/4	1 3/8-1 1/2	5600
20 x 3	3 1/4	1 1/4	2100
20 x 5	5 1/4	1 1/2-1 3/4	6040
28 x 4	6	1 3/8	

*Note: Load ratings are maximum for ease of operation and are based on ideal operating conditions.*

## Dimensional Standards for Plastic Industrial Wheels

(Roller or Ball-Bearing Equipped)  
For Nonpowered Material Handling Equipment

Wheel Diam. & Tread Width, Inches	Hub Length, Inches	Inside Diam. of Bearing or Axle Diam., Inches	Maximum Operational Load, Pounds, 4 mph Continuous, 10 mph Intermittent
3 x 1 1/4	1 5/8	1/2	260
3 x 1 1/4	1 5/8	5/8	260
4 x 1 1/2	1 5/8	1/2	375
4 x 1 1/2	1 5/8	5/8	375
4 x 2	2 1/4	5/8	500
4 x 2	2 1/4	3/4	500
5 x 1 1/2	1 5/8	5/8	440
5 x 1 1/2	1 5/8	3/4	440
5 x 2	2 1/4	5/8	580
5 x 2	2 1/4	3/4	580
6 x 1 1/2	1 5/8	5/8	480
6 x 1 1/2	1 5/8	3/4	480
6 x 2	2 1/4	3/4	640
8 x 2	2 1/4	3/4	675
8 x 2	2 1/4	7/8	675
8 x 2	2 1/4	1	675
8 x 2 1/2	2 3/4	1	850
8 x 2 1/2	2 3/4	1 1/4	850
8 x 2 1/2	3 1/4	1	850
8 x 3	3 1/4	1	920
8 x 3	3 1/4	1 1/4	920
10 x 2 1/2	2 3/4	1	940
10 x 2 1/2	2 3/4	1 1/8	940
10 x 2 1/2	2 3/4	1 1/4	940
10 x 2 1/2	3 1/4	1	940
10 x 3	3 1/4	1 - 1 1/4	1075
12 x 3	3 1/4	1	1240
12 x 3	3 1/4	1 1/4	1240
12 x 3 1/2	4 1/4	1 1/4	1450

# How Efficient are Your

By Forrest W. Soper

Material Handling Engineer  
Euclid Division, General Motors Corp.

In the first installment of this two-part series Mr. Soper described in detail the equipment used in a series of tests to determine fork truck efficiency. He also revealed how that equipment was installed and how certain deterrents to accuracy were eliminated.

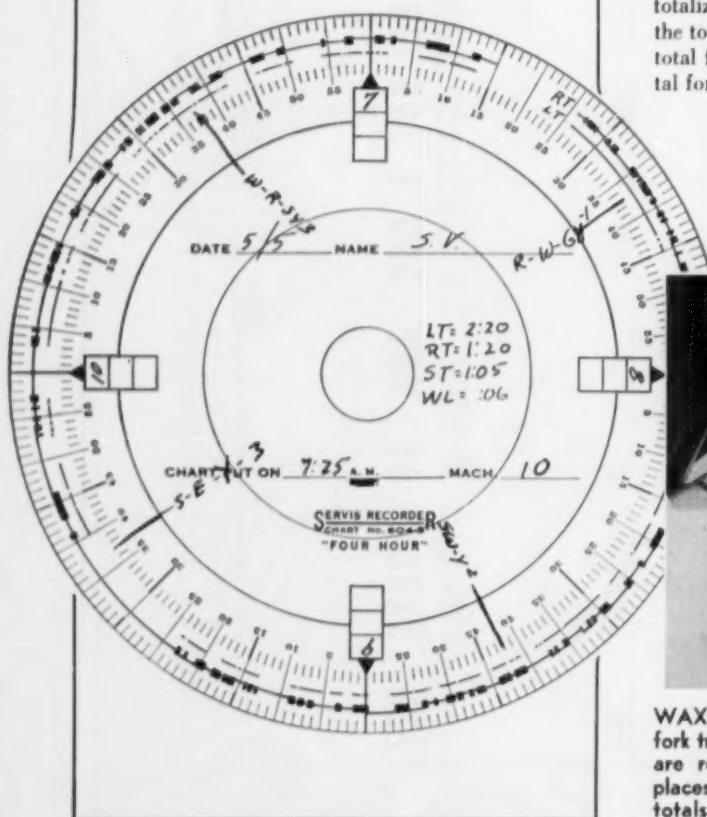
Part II concludes the series by explaining how data from the tests was computed and analyzed. Several solutions are suggested for inefficiencies pointed out by the tests.

THE tests were conducted by three persons: the regular fork truck driver, operating the testing equipment (in no way did the routing testing interfere with his regular work assignment as a fork truck operator); a trained office clerk, who compiled the data and prepared curves daily from the recorded disks; the author, who made daily interpretations and analyses of the data and charts.

## Method of Computation

Two cut waxed disks, representing the work of the day, were received by the office clerk. One disk had data for four hours, from 7:00 AM to 11:00 AM. The other contained data for 3½ hours, from 12:00 N to 3:30 PM. Each disk contained two sets of markings, one revealing when the truck was in motion (called the running-time or RT curve), and the other providing information on how long the truck had a load on its forks (called the load-time or LT curve).

The clerk put the 7:00 AM to 11:00 AM disk on a totalizer and computed four totals. The first one was the total for the running-time curve, the second was the total for the load-time curve, and the third was the total for the vehicle loaded, but standing still. (The third



WAXED DISK (left) is record of half-day's work by one fork truck. It and a disk representing the other half-day are received by specially trained office clerk who places them on a totalizer (above) to compute necessary totals for operating-efficiency studies on both trucks.



# Fork Trucks? . . . . . PART II

was obtained by picking out the times when the load-time line was marked and the running-time curve was not marked).

From the above three totals, the total time for the vehicle running without a load (WL) was computed. The work sheet accompanying this article illustrates the method used for computation of WL. Note that in Step 4 on the work-sheet, ST (standing-still-while-loaded curve) was abstracted from the total LT (Load time curve). The remainder was the amount of total time the vehicle was running with a load (L/R).

L/R was subtracted from the total RT (running time curve) and its remainder was the total amount of time the vehicle was running without a load, or "dead-heading".

The same work-sheet was used to compute mileage. On each disk at 7:00 AM, the truck driver placed the number of revolutions shown on the revolution-counter prior to the day's activity. At 11:00 AM he placed the second list of numbers shown on the revolution-counter

directly above the first group numbers. He repeated the performance at 12:00 Noon and at 3:30 PM.

When the office clerk received the disk, she subtracted the bigger number from the smaller and obtained the number of revolutions the wheel of the vehicle turned during that period. This number was multiplied by a conversion factor ( $\frac{100000}{77}$  for truck No. 1) to give miles traveled. This is shown in Step 6 on the work sheet.

Here is how we arrived at our conversion factor:  
Circumference of the wheel of Truck No. 1 was 49 inches. Therefore,

$$\frac{1 \text{ revolution} \times 49''}{5280' \times 12''} = 0.000077 \text{ or } \frac{77}{100000}$$

After each disk had been completely read and total-

(More on next page)

Month—JULY																TRUCK No. 1			
Date	ST	LT		RT		WL		IT		RT/TT	LT/TT	ST/TT	WL/TT	WL/TR	ST/LT	Dis-	Total		
Day	Hr	Min	Hr	Min	Hr	Min	Hr	Min	Hr	Min	%	%	%	%	%	Miles	time		
1	1	52	5	00	3	32	0		1	22	52.7	73.4	27.6	5.9	11.3	37.3	6 46		
2	2	57	6	00	3	06	0		1	03	43.7	84.5	41.6	0.7	1.6	49.2	7 06		
3																			
4																			
5																			
6																			
7	2	54	5	21	1	42	0		1	08	23.8	73.9	40.1	10.4	44.1	54.2	7 14		
8	2	53	6	42	3	48	0			33	52.3	92.2	39.7	0.2	0.4	43.0	7 16		
9	3	16	6	01	2	53	0			50	41.3	86.2	46.8	1.9	4.6	59.8	6 59		
10																			
11		31	6	42	4	08	0			26	57.6	93.3	35.3	0.7	1.3	37.6	7 11		
12																			
13	1	37	4	43	4	16	1		1	01	61.8	68.4	21.3	16.9	27.3	34.2	10.6 6 54		
14	0	36	3	03	3	30	1		3	05	48.7	42.5	8.4	14.8	30.0	19.7	9.5 7 11		
15	0	27	2	56	3	39	1		2	44	53.4	42.9	6.6	17.1	32.0	15.4	10.4 6 50		
16	00	42	3	47	4	01	0		2	18	57.2	53.9	10.0	13.3	23.2	18.5	8.6 7 01		
17	00	48	3	52	3	33	0		1	52	56.3	46.4	12.9	7.7	13.8	27.7	3.6 6 13		
18																			
19																			
20	0	19	2	53	3	30	0		3	24	48.5	40.0	4.4	12.9	26.7	11.0	7.0 7 13		
21	0	23	3	04	3	52	1		3	01	53.2	42.2	5.3	16.3	30.6	12.5	7.3 7 16		
22	1	17	4	21	3	47	0		2	06	52.8	60.7	17.7	10.0	14.5	29.5	9.1 7 10		
23	1	01	3	53	3	24	0		2	32	48.9	56.1	14.6	7.7	15.7	26.2	10.8 6 57		

ized with the totals marked clearly on the disks themselves, grand totals for the entire day (two disks) were entered on the "Daily Time Record".

To obtain percentage figures for the curves, calculations, such as the samples in Figures IV and V, were used. Percentages were computed for the following:

1. Running-time total per the total time per day (RT/TT).
2. Load-time total per the total time per day (LT/TT).
3. Standing-still-loaded total per the total time per day (ST/TT).



TRUCK  
NO. 2

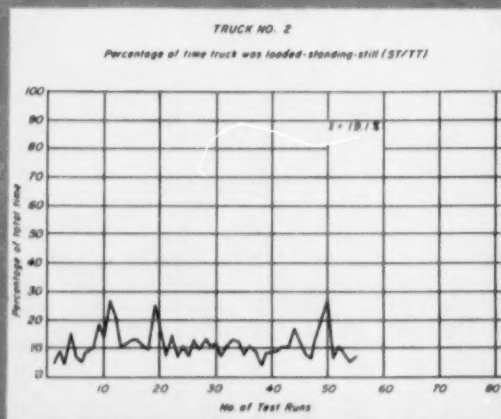
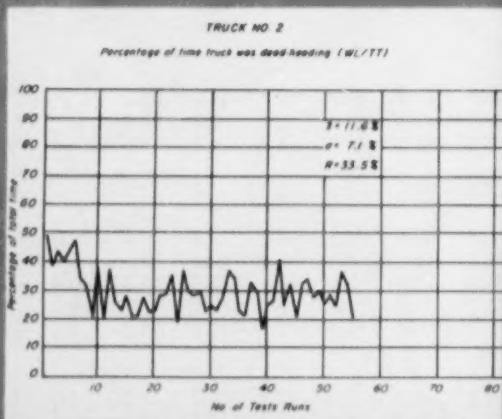
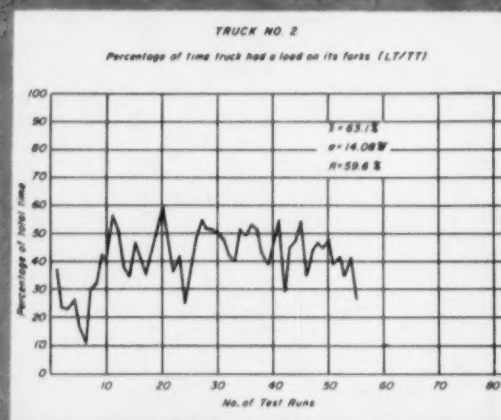
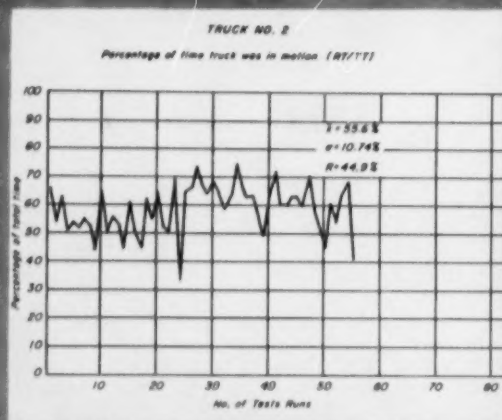
4. Running-time-without-a-load total per the running-time total (WL/RT).
5. Running-time without a load total per the running-time total (WL/RT).
6. Standing-still-load total per the load-time total (ST/LT).

The quotations of each of the above were computed and recorded in the Daily Time Record.

Curves were plotted for only Nos. 1, 2, 3, and 4 described above. The other two figures were excluded because they did not have the same common base. This plotting completed the work of the office clerk. It required, on the average, 40 minutes per day to make all the computations.

The arithmetic mean ( $\bar{x}$ ) was calculated for the running-time percentage curves, the loaded-time percentage curves, the "dead-heading" percentage curves,

## CURVES SHOWING FORK



the idle percentage results and the mileage result. All the individual percentages were totaled and divided by the number of test runs to obtain the average.

The standard deviation ( $\sigma$ ) and the range (R) were calculated for the running-time percentage curves, the loaded-time percentage curves and the dead-heading percentage curves. The idle-time percentage results had distribution of observations similar to the "dead-heading" time percentages since it was calculated from the same set of figures. For this reason standard deviations and ranges were not computed for idle-time percentages. Table I illustrates a sample list of data used to develop standard deviations and ranges.

#### Results of the Tests

The results reported here are based on arithmetic means ( $\bar{x}$ ) computed from the test runs over a given period of time. These averages show central tendencies

only. In order to provide a picture of point variance and dispersion, the standard deviation ( $\sigma$ ) and range (R) were calculated for each of three sets of curves—RT/TT, LT/TT and WL/TT. Under normal plotting, approximately two-thirds of the occurrences fall within one standard deviation ( $\sigma$ ) on either side of the average.

#### Fork Truck No. 1

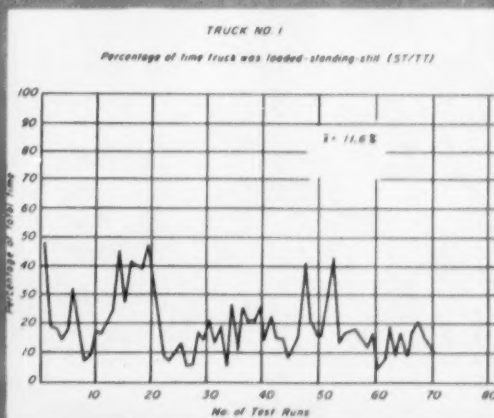
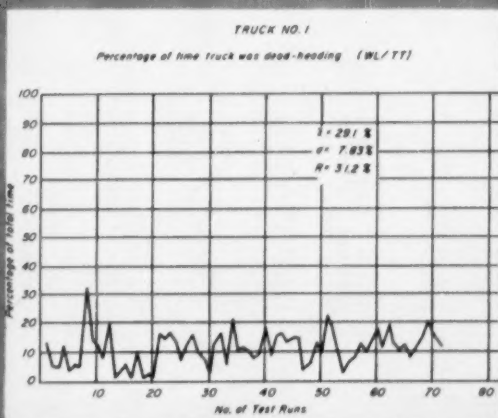
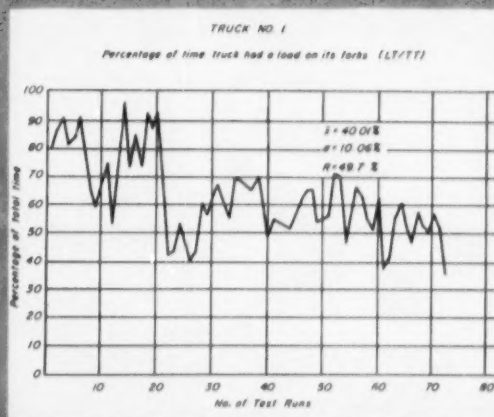
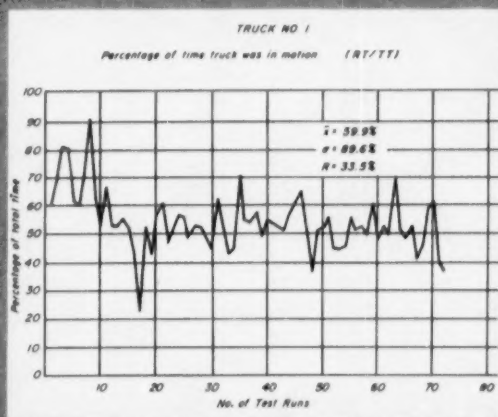
Data was compiled from 70 (7½ hour) test runs over a period of 5½ months. The truck was in motion, on the average, 55.6% of the time, or about 4.17 hours per day. Standard deviation from the average was plus or minus 10.74%. The range from the lowest to the

(More on next page)



TRUCK  
NO. 1

## TRUCK UTILIZATION...



highest daily percentage was 44.9%.

The vehicle averaged 7.7 miles over 20 test periods and had a load on its forks 63.1% of the time, or about 4.83 hours per day. The standard deviation from the average loaded-time percentage was plus or minus 14.08%. The range from the lowest to the highest daily percentage was 59.6%.

Dead-heading amounted to 11.6%, or about 52 minutes, during the 7½-hour period. Standard deviation from the average was plus or minus 7.10%. Range from the lowest to the highest daily percentage was 33.5%.

The truck was idle on the average of 25.1% of the day, or about 1.9 hours.

#### Fork Truck No. 2

Data was compiled from 55 (7½-hour) test runs over a period of three months.

The truck was in motion 59.9% of the time, or about 4.49 hours per day. The standard deviation from the average was plus or minus 8.96%. The range from the lowest to the highest daily percentage was 33.5%.

No record was made of the distance traveled by this truck during that period. It was estimated, however, based on a comparison of job assignments only, that the truck must have traveled at least 12 miles per day. It had a load on its forks 40.10% of the time or about 3.00 hours per day. The standard deviation from the average loaded-time percentage was plus or minus

10.06%. The range from the lowest to the highest daily percentage was 49.7%.

Dead-heading amounted to 29.1%, or about 2.2 hours during the 7½-hour period. The standard deviation from the average was 7.83%. The range from the lowest to the highest daily percentage was 31.2%.

Truck No. 2 was idle on an average of 29.99%, or about 2.2 hours per day.

#### Analysis of Results

Looking at the summary of results, a comparison is immediately drawn between the performance of the two fork trucks. A paradoxical situation seems to have developed. Fork Truck No. 2 was in motion 4 1/3% more than No. 1 and yet No. 1 had a load on its forks 23% more of the time.

At first, one might be inclined to favor Truck No. 2 as the one which was doing the most work, because

FIGURE II WORK SHEET

STEP 4				STEP 8			
"DEAD-HEADING" (WL)				TOTALS			
7:00 AM		12:00 N		ST	HR	MINS	TOTAL
LT	1:31	1:17		7 Chart	11		
ST	—11	—17		12 Chart	17		
L/R	1:20	1:00		Total ST			28
RT	2:21	2:06		LT			
L/R	1:20	1:20		7 Chart	1	31	
WL	1:01	1:06		12 Chart	1	17	
				Total LT	2	48	168
STEP 6				RT			
MILEAGE (MI)				7 Chart	2	21	
				12 Chart	2	06	
				Total RT	4	27	267
				WL			
				7 Chart	1	01	
				12 Chart	1	06	
				Total WL	2	07	127
				TT			
				7 Chart	354		
				12 Chart	322		
				Total TT	716		436
				MI			
				7 Chart	5.0		
				12 Chart	2.6		
				Total MI			7.6

FIGURE III—SAMPLE OF SHIFT COMPUTATIONS

TRUCK NO. 1							
X SHIFT COMPUTATIONS							
NO.	RT/TT TEST DEVI- RUN TIONS	DEVI- ATION SQD.	LT/TT DEVI- ATION TIONS	DEVI- ATION SQD.	WL/TT DEVI- ATION TIONS	DEVI- ATION SQD.	
	50.00%		60.00%		10.00%		
40	5.0	2500	6.6	4356	123	151.29	
41	4.0	1600	7.1	5041	53	28.09	
42	3.2	1024	9.5	9025	50	25.00	
43	1.8	324	7.6	5776	1.6	2.56	
44	7.8	6084	4.4	1936	2.1	4.41	
45	12.3	15129	4.5	2025	6.7	44.89	
46	15.5	23025	5.3	2809	14.0	196.00	
47	0.9	81	6.0	3600	4.0	16.00	
48	13.4	17956	5.6	3136	37	13.69	
49	2.0	400	2.5	625	0.3	0.09	
50	2.4	536	12.3	15129	12.4	153.76	
51	6.0	3600	11.0	12100	8.3	68.89	
52	7.5	5625	13.6	18496	0.7	0.49	
53	7.6	5776	2.8	784	7.6	57.76	
54	6.6	4356	6.5	4225	3.9	15.21	
55	6.0	3600	3.2	1024	1.8	3.24	
56	1.5	225	4.4	1836	2.8	7.84	
57	2.8	784	9.0	8100	0.7	0.49	
58	0.0	00	3.0	900	1.1	1.21	
59	11.6	13456	22.8	51984	4.2	17.64	
60	2.0	400	18.7	35069	8.1	65.61	
61	2.7	729	2.5	625	1.8	3.24	
62	0.3	009	1.0	100	9.8	96.04	
63	21.0	44100	7.1	5041	3.2	10.24	
64	2.0	400	13.6	18496	0.8	0.64	
65	1.6	256	2.2	484	2.5	6.25	
66	12.8	16384	7.0	4900	1.9	3.61	
67	9.0	8100	9.0	8100	1.3	1.69	
68	3.8	14.44	2.5	625	5.8	33.64	
69	9.5	90.25	8.2	6724	10.4	108.16	
70	11.6	13456	22.8	51984	3.5	12.25	
TOTAL		10309.56		14641.40		3776.30	
RT/TTX̄ = 55.6% - 50.00% = (5.6%)² = 31.36							
LT/TTX̄ = 63.1% - 60.00% = (3.1%)² = 9.61							
WL/TTX̄ = 11.6% - 10.00% = (1.6%)² = 2.56							



of the apparent greater activity. However, our tests proved that fork truck No. 1 was 23% more efficient, assuming, of course, that both trucks handled approximately the same size unit loads.

*If loads were approximately the same size, why did Fork Truck No. 2 appear to be so inefficient?*

The answer lies in a comparison of the amount of dead-heading by the two trucks. No. 2 spent almost 50% of its total running-time traveling without a load, whereas No. 1 spent less than 25% empty. Fork truck No. 2 did 17% more dead-heading.

Our tests revealed that 29.1% of the entire work day of Truck No. 2 was spent traveling about without a load on the forks. The work assignments of the two trucks provides the answer.

As mentioned in last month's installment, Fork Truck No. 1 worked outdoors in a concrete area of approximately 10,000 square feet. Most material was stacked up to 172 inches in a rather confined area. Long hauls were kept to a minimum. The vehicle had a secondary job—a pallet placed on its forks served as a platform elevator to raise stockers up and down while the truck remained stationary.

Fork truck No. 2 worked in the same area and, in addition, stocked and order-picked parts in a 20,000 sq. ft. heavily-graveled yard where a hard rubber-tired vehicle would be at a disadvantage. Most material handled was stacked only 60-inches high. Because of its faster speed, this truck was specifically assigned all long hauls. Of course, the longer the trip, the greater the dead-heading time when the truck returned without a load. A further gap was opened between the efficiency curves of the two trucks by the supplementary job performed by truck No. 1. The chart showing percentage of time Truck No. 1 was loaded-standing-still, reveals that 19% of the time was used, in the most part, for the extra work. The chart also shows that on the 14th test-run, when the supplementary job was over 40%, the truck's total load was over 90%.

Curves plotted on the percentage of time Truck No. 1 was in motion and had a load in its forks, show

a downward trend, indicating lessened activity on the part of the truck. Because outdoor work is seasonal, there was probably more activity in the yard during the months of June and July than in the later months, October and November.

All three curves of both trucks had a wide variance of observations and unusually large ranges. Note the sporadic deviations from the normal. The secondary job of Truck No. 1 was one of the important reasons for the widely scattered points on its curves. Work assignments of these two trucks are tempered by changes in weather. Although they both functioned in inclement weather, their work paces were definitely affected as indicated by the computed standard deviations. These trucks do not have routine assignments where identical work is done day after day. Hence, the relatively large standard deviations.

One of the unusual jobs of the two trucks was the unloading and loading of boxcars. This task occurred two or three times a month. High loaded-standing-still curve percentages for Fork Truck No. 2 indicate that specific operation. It is more difficult to identify that job with the records of Truck No. 1. The high curve percentages reflect the necessity for the trucks to hold pallets up to the level of the boxcar floor for a period of time so that the material handlers could load or unload by hand. Therefore, the record indicated that the trucks were standing still with loads on their forks.

Great dips in the curves indicate lessened activity.

Test run 7 (for all four curves of Truck No. 1) illustrates how unusual work of the truck can be spotted by an analysis of the curves. The loaded-time curve went down to 65% and the loaded-standing-still dropped to 7%. Note, however, that the running time curve is at its highest point of 92%. With low loads and high running time, the dead-heading time curve was at its maximum of 33%.

(Continued on page 132)

FIGURE IV PERCENTAGE CALCULATIONS

DAY	RT/TT	LT/TT	ST/TT	WL/TT
1	195/439	150/439	51/430	96/439
2				
3	268/440	205/440	60/440	125/440
4	218/434	183/434	54/434	89/434
5	197/438	154/438	49/438	92/438
6				
7				
8	238/382	172/382	37/382	103/382
9	241/442	235/442	113/442	99/442
10	285/440	263/440	81/440	103/440
11	228/435	200/435	34/435	122/435
12	218/432	155/432	61/432	124/432

NOTE: PERCENTAGE CALCULATIONS WERE ALSO INCLUDED ON THIS SHEET FOR WL/RT and ST/LT

FIGURE V ARITHMETIC MEAN, STANDARD DEVIATION, AND RANGE COMPUTATIONS

TRUCK NO. 1 (70 TEST RUNS)

RUNNING TIME DISTRIBUTION

1. The arithmetic mean  $= \bar{X} = \frac{\sum xn}{n}$ , where  $x$  = each percentage reading for 70 test runs  $X = 55.6\%$

2. The standard deviation  $= \sigma = \sqrt{\frac{\sum x^2}{n} - \bar{X}^2}$

To compute: shift  $\bar{X}$  from 55.6% to 50.00%  

$$\frac{10309.56}{70} - 31.36 = 115.92 = 10.74\%$$

3. The range  $= R = \text{largest } X - \text{smallest } x = 81.5 - 36.6 = 44.9\%$



## Crane & Charger Cut Man-hours 75%

**A** TIRE-MOUNTED CRANE, operating in a yard only 24 feet wide and 150 feet long, has—along with a cupola charger—reduced man-hours of heavy labor by some 75 per cent, as conservatively estimated by management.

The F. E. Meyers & Bro. Co., in Ashland, Ohio, produces pumps and domestic water systems, for which castings of semi-steel and iron are required. The first manufacturing operation is the charging of the foundry cupola. By manual methods, this formerly required a charging gang of five men and a yard crew of three. It was a full-time job for all.

With the installation of the electrically operated charger and the acquisition of the crane, the combined outside crew was reduced to one crane operator and one man at the charger bucket and scale. Now the crane spends three hours a day charging the cupola, loading 3000 pounds of five different kinds of scrap and pig iron in each charge. It has handled up to 19 charges—57,000 pounds—in an afternoon, after emptying two rail cars of pig iron in the morning.

In the unloading operation, alone, the company has made a tremendous gain. It used to take five men a full working day to unload a car by hand. Now the

crane operator does it alone, and he can complete the job in an hour.

In his "spare time", the crane man loads scrap from the machine shop into a gondola. Without him and his mobile equipment, the job usually took 16 man-hours. The crane normally handles it in an hour or less.

The crane also does other valuable work, such as unloading bar steel from highway trucks, unloading heavy machinery, occasionally, from rail cars, and spotting cars for maximum handling efficiency. As a matter of fact, the crane helped to form the material handling system of which it is a part—by unloading the structural steel used to assemble the charger.

There's a "Mutt and Jeff" aspect to this operation. A normal "heat" consists of 14 charging buckets, with each ingredient carefully weighed on the charger scale. The crane takes care of the heavy handling—the operator has become highly skilled at releasing just the right amount of metal from his magnet to make a weight. And the smaller quantities of coke and limestone are supplied by wheelbarrows.

*Photo and data courtesy The Electric Controller & Mfg. Co.; Modern Equipment Co.; Ohio Machinery Co.; and Thew Shovel Co.*



## Why some fork lift trucks lose their forks

On many materials handling operations, Towmotor *job-planned* accessories are more efficient than pallet forks. For example, this Towmotor Revolving Roll Clamp helped *triple* storage capacity by unloading, transporting and high-stacking paper rolls. Cost reductions of 85% in materials handling are not uncommon for Towmotor users . . . *and these dollars saved become extra profit.* Complete information is available from your nearby Towmotor Sales Representative. TOWMOTOR CORPORATION, Div. 809, 1226 E. 152nd St., Cleveland 10, Ohio.



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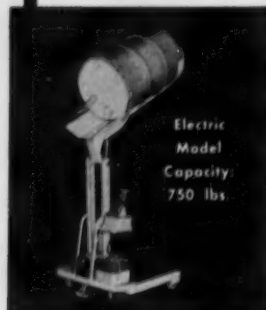
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LIFTING EQUIPMENT

Check Uhlden's versatile, low-cost **Tubar** line first. Each unit is job-designed to speed and streamline materials handling—and priced so reasonably that you can start to cut your flow costs right away. Write for complete, descriptive literature.\*



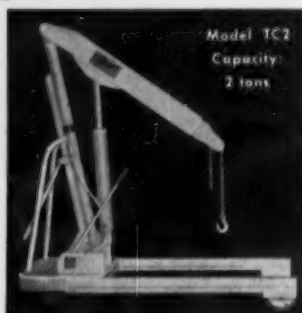
Electric  
Model  
Capacity:  
750 lbs.

## Tubar DUMPER

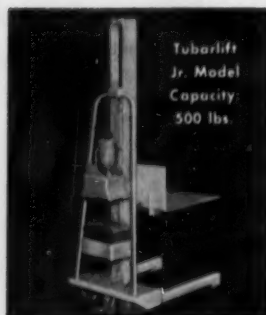
Low-cost, mobile, hydraulic unit designed to lift containers, move them, and transfer contents from one container to another. Manually operated or powered by 6-volt automotive battery. Floor locks on all models. Capacities: 750 to 1,500 lbs.

## Tubar CRANE

Compactly designed to occupy far less floor space than other cranes of its capacity. Ideal for garages, shops, store rooms, and other applications where light weight, compactness, and versatility are required. Available with manual or electric power. Capacities: 1/2 thru 3 tons in 7 models.



Model TC2  
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2 tons



Tubarlift  
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## Tubar LIFT

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# Tubar

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### JOBBER TERRITORIES AVAILABLE

\* Also request literature on Tubar Hand Trucks, Platform Trucks, Tubarlifts, and Tubar Dumpers.

## CONVEYOR SCALES . . .

(Continued from page 32)

(e) Slippage: The material must be moved at belt speed over the weighing section and not slip or roll back on inclined conveyors.

### 3. Conveyor

(a) Levelness: The conveyor frame should be level in a transverse direction throughout its length.

(b) Squareness: The idler support brackets and the head pulley bearings should be placed so that the shaft axes are perpendicular to the conveyor frame.

(c) Belt Take-up: The belt tensioning means should preferably be of the gravity type to exert constant belt tension. It may sometimes be necessary to lag the driving pulley to avoid excessive belt tension.

(d) Accessories: Plows, magnets, trippers and the like which deflect the belt should be located at a distance from the weigh section sufficient to avoid all effect of the belt deflection.

(e) Protection: The weighing section of the conveyor should be protected from the wind so there is no tendency for the belt to be lifted or depressed.

### 4. Conveyor Idlers

(a) Spacing: The belt carrying idlers should be located on equally spaced centers before and after the weighing section.

(b) Concentricity: The idler rollers should be well centered on their shafts; where belt tension is high, lathe turned idlers are recommended.

(c) Squareness: The idler roller axes should be square with the conveyor stringers.

(d) Adjustment: The height of the belt carrying idlers above the conveyor frame should be capable of adjustment to obtain proper alignment of the belt approaching and leaving the weighing section.

### 5. Conveyor Belt

(a) Type: Smooth surface belts should be used; belts having flights or other projections are not permissible if the speed pick-up roller contacts the carrying side of the return belt.

(b) Tracking: The belt should run consistently parallel to the conveyor stringers, when empty and loaded.

(c) Contact: The belt should touch all idler rollers at and near the weighing section when running empty and loaded; flat belts are easier to so adjust than troughed belts.

(d) Splice: The most desirable belt, from the standpoint of weighing accuracy, is the endless type, while belts having a skived and vulcanized joint are rated second; mechanical splicing means should have a minimum protrusion above either belt surface and should have a good longitudinal and lateral flexibility to permit the belt to follow the roller contour and to permit troughing.

(e) Uniformity: The weight per foot of the belt should be uniform; in one complete revolution of the belt, variations in its weight will cancel out, but on

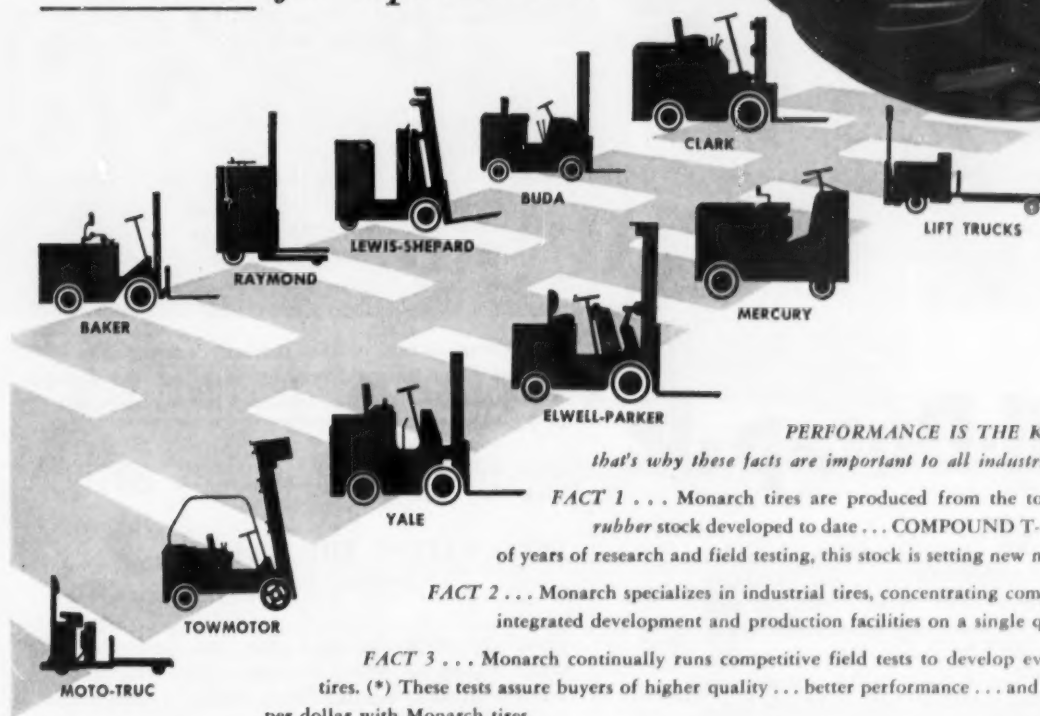
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# MONARCH

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*Specified as original equipment*  
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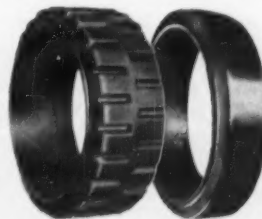
**FACT 3 . . .** Monarch continually runs competitive field tests to develop even better solid tires. (\*) These tests assure buyers of higher quality . . . better performance . . . and more ton-miles per dollar with Monarch tires.

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**FACT 5 . . .** Monarch has a type and size of solid tire for every materials handling truck application.



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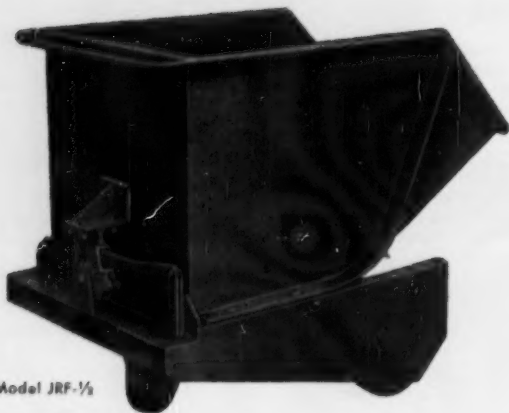
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Model JRF-1/2

## Phil-Dump Jr.

Sturdily built to withstand rough fork truck service, the versatile Phil-Dump Jr. is still designed and sized for speed and convenience when propelled by hand. Features a self-dumping hopper which returns to loading position—automatically locks after emptying. Tires are hard rubber—rear wheel castered. Capacity one-half cubic yard.

Write for Bulletin E-1a.

### SALEM-BROSIOUS,

Carnegie, **INC.** Pennsylvania

PHILLIPS MATERIALS-HANDLING EQUIPMENT

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106

## CONVEYOR SCALES

*Continued*

long conveyors and short duration runs a weighing error will result if the belt is not of uniform weight.

### 6. Scale

(a) Weigh Platform: The weigh platform should be free to move in a vertical direction and should be restrained from appreciable motion in other directions; it should not touch the other parts of the scale or conveyor frames.

(b) Weigh Platform Suspension: The weigh platform suspension rods should be plumb and adjustable to allow the weigh platform to be leveled transversely; all adjustments should be equipped with suitable locks.

(c) Beams: Provision should be made for properly leveling the weighing beams when such are used.

(d) Tare Balance: The tare weight of the weighing platform and the empty belt should be properly balanced so that the totalizer indicates zero when the belt is running empty. Periodic checks should be made.

(e) Belt Speed Indicator: The belt speed pick-up roller should be so adjusted that it transmits true belt speed without slippage.

(f) Enclosure: Beams, beam pivots, totalizing means and other instrumentation should be adequately protected from dust, dirt, corrosion and weather.

(g) Maintenance: The belt conveyor scale should be given proper maintenance as recommended in the manufacturer's detailed instructions.

*The second section of this subject, covering Recommended Practices for Planning, Installing and Using Gravimetric Feeders, will appear in a subsequent issue of FLOW.*

## INTEGRATING THE CRANE . . .

*(Continued from page 87)*

electric power production. In this type installation the crane is used for setting the generating equipment in place originally, maintaining it thereafter. The single leg gantry is often used in a shop underneath a top running overhead electric crane for serving a specific location requiring frequent lifts.

The third type is the underhung crane and monorail system, which is among the most versatile of all overhead material handling equipment. This crane is suspended from the building trusses, or from overhead steel or wood structures, with the crane or carrier wheels operating on the top side of the lower flange.

This arrangement is in direct contrast to the top running crane, where the runway consists of a wide flange girder supported by brackets on the building columns. An ASCE railroad type rail is then placed on top of the wide flange beam, and the crane wheels operate on this rail.

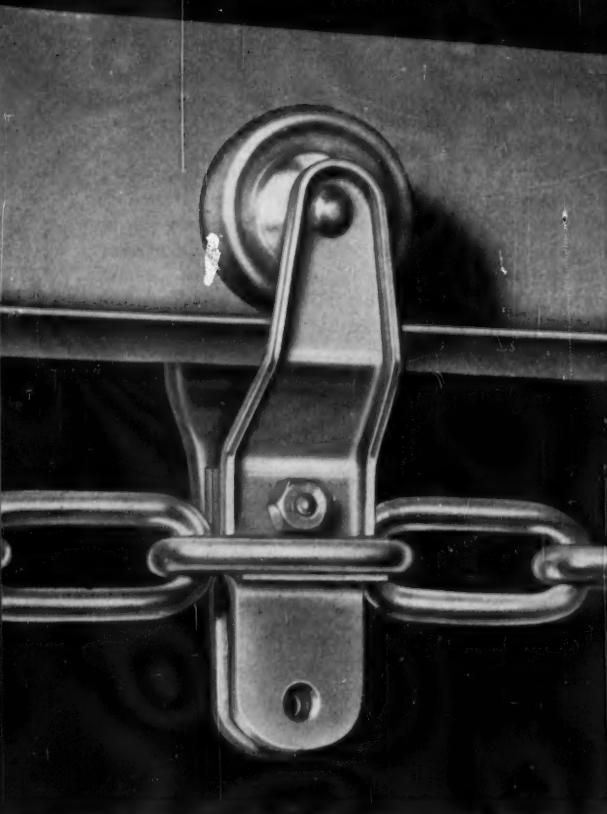
When an underhung crane system is used it is also

**FLOW**

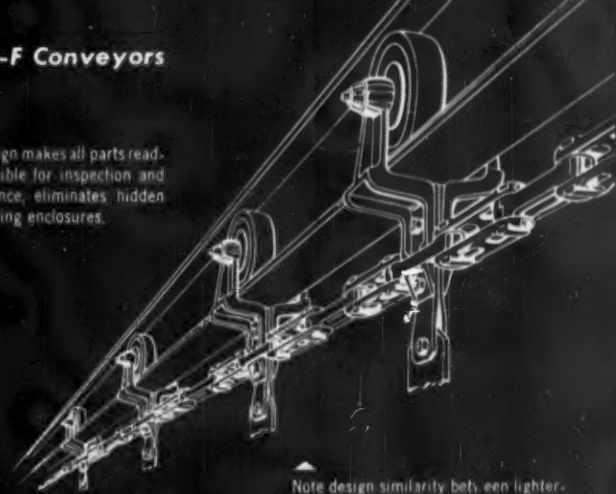
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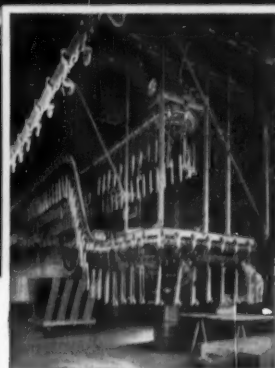
Announcing TROL-E-VEYOR by A-F Conveyors



Open design makes all parts readily accessible for inspection and maintenance, eliminates hidden dirt-catching enclosures.



Note design similarity between lighter-duty Trol-e-veyor (left) and heavy-duty version (above). Trolleys, chain, track, even sprockets follow proven-efficient engineering precedents—assure smooth operation and minimum maintenance.



Automatic dipping operation eliminates troublesome backlog in small parts painting. Here, conveyor speed is timed so that parts are dry at end of the line. One operator handles whole operation. Note Trol-e-veyor's steep inclines, tight horizontal turns and vertical curves, minimum superstructure.

## New low-cost TROL-E-VEYOR

**gives you all the advantages of proven heavy-duty designs!**

Now, at low cost, your smaller manufacturing and processing operations can have full benefit of overhead handling and storage. With new A-F Trol-e-veyor, you can save valuable floor space, reduce handling time, make whole operations more efficient.

Trol-e-veyor gives you all the advantages of proven heavy-duty designs, at a new low price that will likely fit within your smaller operations budget. Yet you can expect the same low maintenance, smooth operation, quality engineering and workmanship of far more expensive conveyor systems.

Years of A-F engineering experience, in all types of conveying, back this new lighter-duty design.

Because of Trol-e-veyor's design simplicity, components are immediately available from stock, installation is quick and low-cost. Optional 8", 12", 16" or 20" trolley spacing assures fitting your job correctly at minimum cost. Load factors are more than ample. Loads up to 160 lbs. can be handled easily without excessive wear.

Get complete details on Trol-e-veyor now. Call your A-F Distributor or write today for our new TROL-E-VEYOR BULLETIN.



*A-F founded the package conveyor business in 1901*

## A-F Conveyors

Custom Engineered Conveyor Systems

Packaged Conveyors—Wheel, Roller, Belt, Trolley

Pan and Rack Washers

Metal Cleaning and Processing Equipment

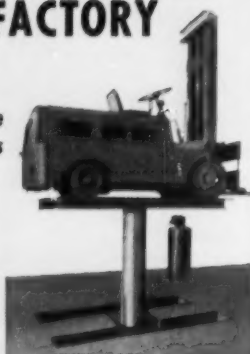
The Alvey-Ferguson Company, Dept. DD-9, Cincinnati 9, Ohio and Azusa, California

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## HYDRAULIC FEED TABLES

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into production machines**

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## INTEGRATING THE CRANE

*Continued*

advisable to use a running surface which has approximately the same steel characteristics as the ASCE rail.

In underhung crane systems, the runway is uppermost, with the end truck of the bridge running on its lower flange. The bridge girder is attached to the truck, is underneath the runway, and extends beyond the runway itself; thus, the overall length of the girder is greater than the center to center distance of the runway rails. It is this inherent quality which makes underhung equipment so flexible in its application.

By simply adding to the ends of the bridge girder a device called an interlock, the bridge girder can be directly connected to another girder, either a crane girder or a monorail spur. Remember that the carrier supports the hoist unit and traverses across the bridge girder. Therefore, the carrier with its hoist and load can be moved throughout the plant without lowering the load to the floor.

Often, cranes cannot be directly interlocked because of the building columns which may be in between. Then, each crane is interlocked to a fixed transfer section which is about two feet long, located in the building column line.

### Practical Application of the Interlock

How does this work out in practical application? As an example, let us consider the normal flow of materials through most plants. It is from receiving to storage, to machine shop, thence to sub-assembly, to final assembly, and then to shipping, or some similar sequence of operations. It is possible to have an underhung type single-leg gantry crane over a receiving dock, which may accommodate railroad cars or trucks or both. This gantry will be used in unloading the incoming raw material.

The gantry will then interlock with a spur monorail to carry the load through a doorway. The spur will, in turn, be interlocked to a crane which is over the storage area for the incoming material.

It is possible to lift the material from the incoming vehicle and transport it to its storage location in one continuous operation without lowering the load to the floor. The load can be deposited at any point underneath the crane and stacked as high as is desirable.

When it is time for the material to be used in production, it can be picked up from its storage location by the crane and taken to the machining, sub-assembly, or fabricating floor. This may require the carrier and hoist with the load to travel through a fixed transfer section to the crane which serves these floors.

This same procedure is followed as the part proceeds through its various production operations and finally reaches the shipping dock. The part will have traveled all the way through production without being placed on the floor except as temporary storage, or as working conditions demand.

An unusual installation was recently engineered and installed in the warehouse department of a major aircraft producing plant.

Picture a building 960 feet by 320 feet wide, having

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THESE are the easiest-to-handle slings ever put on the market. There are no servings—no bulky sections of rope next to the loop. All wire ends are safely and permanently covered by the tapered sleeve. And on top of that, these slings are remarkably flexible, *doubly* safe, and real time-savers on the big majority of lifting jobs.

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# Get rid of Parts-Handling Headaches for good!



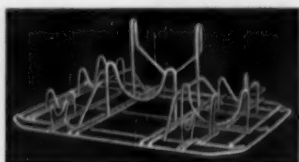
You can simplify handling and speed production flow—permanently and economically—with WIPCO Custom Baskets and parts-handling products! Specially designed to meet the requirements of your specific handling system, WIPCO handling products put parts *where* you want them, *when* you want them, and *the way* you want them! They protect parts from damage, dirt and spillage—step-up efficiency in conveying, assembly, dipping, pickling, painting, drying, draining and degreasing operations.

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110

## INTEGRATING THE CRANE

*Continued*

16 bays each 60 feet wide by 320 feet long, covering a total of 307,000 square feet. The entire warehouse is completely covered with cranes. In the storage area there is a 20 foot aisle across the 16 bays at the center of the building. This warehouse is responsible for supplying the plant's fabrication and production lines with everything from rivets to sheet aluminum. In order to protect against fire, the warehouse is divided into four sections, each 240 by 320, with firewalls in between and only the single opening at the center aisle.

Economy and flexibility were the keynotes in planning the crane service for the warehouse building. It was necessary to have complete coverage—certain storage areas were very active and required more crane service than others; some areas required only infrequent service.

As finalized, there are 16 crane runways, one in each bay—each runway is 320 feet long.

Over the center aisle in each runway girder there are a pair of motor operated turntables, or a total of 64 turntables in all. These turntables turn 90 degrees to serve another runway which is directly above the center aisle. By this method the cranes can operate in the normal manner on any of the 320 foot runways. When it is desirable to move a part—or maybe the crane only—from, say, Bay No. 1 to Bay No. 16, it is possible to bring the crane to the center aisle and, with the swiveling trucks on the turntables, rotate them 90 degrees. It is then possible for the crane—with its carrier, hoist and load—to move down the center aisle to the desired runway.

The operator controls the turntables ahead of him, which have control bars extending about 20 feet on all sides. When the operator reaches the bay in which he wishes to deposit the load he stops on the turntables, rotates all four turntables and trucks, and is then ready for normal operation in that particular bay.

There are only 12 cranes required to serve the entire 16 bays. All cranes have a span of 48 feet with 4 foot 8 inch overhang on each end for a total overall coverage of 57 feet 6 inches in the 60 foot bays. Cranes are just under 20 feet in overall width so that they just pass through the doorways.

There are four two-ton floor operated cranes with swiveling end trucks. There are four 7½-ton, single-hoist, cab-operated cranes of the double girder type, which also have swiveling end trucks. One 7½-ton crane with a four ton auxiliary hoist is also of the same design. Three two-ton, non-swiveling, floor-operated cranes are used in the areas of high activity for intra-bay movement of materials only.

### Powered Lifters Provide High Speed

Working with these cranes, to move the great quantities of aluminum and steel sheet—as well as other bulky and awkward loads—are “crab”-type lifters. They handle from 100 to 150 tons daily in an operation which requires stock in various sizes and specifications to be selected from the storage area and delivered to machines in minimum time. In addition, the lifters

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# MATERIALS-HANDLING NEWS

★ Panel Discussions by Bassick, World's Largest Manufacturer of Casters and Floor Protection Equipment ★

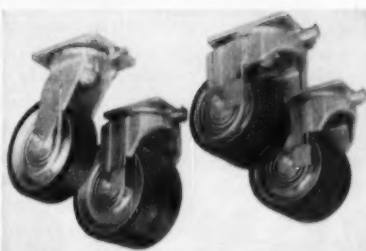
## New Bassick "MilSpec" Casters meet military specifications



Bassick's new "MilSpec" line is specifically designed and engineered to meet the requirements of MIL-4749 and MIL-C-4750 for precision swivel and wheel bearings, sealed bearings, adjustable swivel bearings.

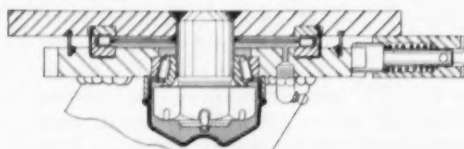
The new line includes 8, 10 and 12 in. heavy-duty, swivel and rigid casters for both inside and outside service on either hand- or power-pulled materials-handling equipment.

The swivel bearings are self-contained, precision units of the highest quality. Wheel bearings are the finest tapered

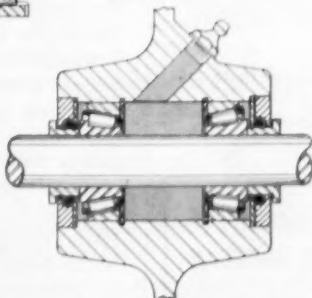


type. Threaded king bolt and slotted nut construction make fine adjustment of swivel bearing possible.

## "MilSpec" sealed swivel and wheel bearing assembly



Gray areas show lubrication reservoirs.



Bassick's sealed construction keeps dirt, water and foreign matter out of both wheel (right) and swivel bearing (above) assemblies of "MilSpec" casters. Protective lubricant stays in to prolong life and insure easy action. Alemite pressure-type grease fittings permit flushing and re-greasing with standard grease guns.

## MilSpec "Floating-Hub" Caster gives safe ride



Important in the new "MilSpec" line is Bassick's famous "Floating-Hub" caster.

## Smothers shocks

It combines the shock absorption of "Floating-Hub's" sprung-wheel construction with the precision quality of "MilSpec" casters. MilSpec "Floating-Hubs" give any load a safe ride — should be first choice in handling any equipment subject to damage in moving.

## Tops on rough terrain

They're also better suited for higher speeds and rougher terrains than ordinary casters. And with adjustable precision sealed bearings, MilSpec "Floating-Hubs" will stay on the job long after lesser casters call it quits.

## Write for information

Write to Bassick for printed data on the new "MilSpec" casters. Remember — an original investment in quality casters pays off in added years of trouble-free, money-saving performance. Specify Bassick casters and you'll be sure you have the best.

There is an authorized distributor of Bassick casters conveniently located to give you service. He's always a good source of information about new product developments.



THE BASSICK  
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# POWER STEERING

STANDARD  
ON NEW

**truck-man**  
**W-40**

\*TWO TON  
HIGH-LIFT



\*Capacity with a 24" load center.  
GUARANTEED FOR A 25% OVERLOAD

**THE DRIVER IS BOSS**—Not the truck. Power steering means one finger turning, even at a standstill—Reduces operator fatigue and increases efficiency. No tripping over levers or hoses getting on or off either, all dials and levers are just inches below the steering wheel where they belong for effortless handling and added safety. Tilting mast (10" backward, 3-5" forward), speedy lift and 6 inches of free lift complete the picture of a real material handling tool.

**POWERHOUSE ON WHEELS**—The sturdy, 4 cylinder, industrial engine produces 40 Brake Horse Power — Oversized clutch, transmission and Timken drive axle deliver it without strain. Extra wide tires, front and rear provide the traction to take full advantage of it. Speeds up to 8 mph., forward or reverse.

**COMPACT**—Intersecting aisles need be only 64" wide. Only 38" x 76 1/4" (less forks), the W-40 turning radii are only 2" inside and 71" outside.

**A SOFT TOUCH FOR MECHANICS, TOO**—Here's a truck designed for economical maintenance. Tilt cylinders, engine, transmission, clutch and other wear parts are easily worked on or removed.

**VERSATILE**—Standard Lift is 108"—others to order. A wide variety of fork styles and attachments are also available.

**LOTS OF OTHER FEATURES**—including: double acting hydraulic brakes, honed tilt and lift cylinders; but why not get the complete story? Even with power steering and extra capacity the W-40 costs less. Call your Truck-Man dealer or write today for folder and price information on the NEW TRUCK-MAN W-40.

## OTHER truck-man TRUCKS

MODEL Y-40—TWO TON, OUTDOOR HIGH-LIFT  
MODEL DHP—4500 LB., LOW LIFT SKID TRUCK  
MODEL DFP—3000 LB., LOW LIFT PALLET TOWER

**truck-man**

**DIV. OF THE KNICKERBOCKER CO.**  
**582 LIBERTY ST., JACKSON, MICHIGAN**

## INTEGRATING THE CRANE

*Continued*

unload incoming material from carriers' trucks or cars, move it to the storage area, and stockpile it.

Each lifter is a motor-operated, five-ton unit. Powered opening and closing adjustments of the jaws, as well as adjustments to the carrying arms, are controlled by one man from the end of the lifter. At no time is it necessary for the lifter operator to go between storage piles. The carrying arms are hinged and can be moved in or out so that they will hang almost vertically at all times. It is thus possible to lower the lifter arms in very small spaces between piles. Maximum storage is thereby maintained in minimum floor area.

The high speed of the opening and closing adjustments quickens the job of picking up and depositing the packs of aluminum or steel. Infinite opening and closing of the jaws within their extreme positions permits the handling of a wide range of sheet widths. The maximum sheet which can be handled by the lifters is 60 inches wide by 144 long; the average pack is 60 x 144 inches; and the average lift is five tons.

Wide carrying angles of the lifters provide maximum bearing on the bottom of the pack to prevent any damage to the high grade aluminum and steel stock. The carrying angles also permit the equipment to pick up and carry special storage trays used for classifying and storing miscellaneous lengths of aluminum sheet.

## Mechanized Foundry Installation

Another interesting installation is indicative of the trend toward "automation". In a gray iron foundry, it involves the charging of a battery of four cupolas.

The charges, consisting of pig iron, scrap, stone and coke, are made up in the yard by an overhead crane. The buckets containing the charge are then brought to a pickup point, underneath the monorail charger, by a transfer car operated at ground level. The operator on the transfer car hooks the bucket on the hoist hook of the monorail charger. He then presses a button and the hoist unit starts raising the bucket from the platform of the transfer car.

From this point on the cycle is completely automatic. The bucket is raised to the high point of its lift, which is at an elevation ready to enter the charging door of the cupola. When it reaches this position—if the charge in the cupola has melted down far enough to allow for another charge—the charger starts forward over the monorail track, moving through a series of switches to the cupola which was pre-selected by the operator on the transfer car. When it reaches the cupola, the bucket is lowered inside and the contents discharged through bottom gates. The bucket is raised back to its maximum lift, the charger withdraws from the cupola and proceeds back to the pick-up point. It then lowers the empty buckets to a point approximately six feet above the transfer car.

By this time, the operator on the transfer car has obtained another loaded bucket from the yard crane. He lowers the empty bucket onto the car, unhooks it, hooks on the full bucket, and repeats the process. This is "automation"—mechanization of a cycle of opera-

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**SMALL  
CARRIER...**

**HANDLES  
BIG LOAD**

*...naturally it's*

## **AMERICAN MONORAIL**

This American MonoRail Monotractor unit, recently installed in a rug and carpet warehouse, dispatches hard to handle, big bulky loads over a wide area. Fully automatic, with finger-tip control, with a hoist capacity of 1,000 pounds, this installation is **SAVING 200 MAN HOURS PER WEEK.**

*For Continuous Flow of Light Loads  
Use Landahl Chainless Conveyors*

This is another of the many examples of American MonoRail engineering for low-cost, efficient overhead handling. Let your American MonoRail representative explain the versatility, low cost and low maintenance of American MonoRail equipment. Consultation in connection with any handling problem is available without obligation.



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## INTEGRATING THE CRANE

Continued

tions without operator attendance except at specific intervals.

A completely automatic approach on different applications will eliminate the need for men to attach the load to the crane hook. This began a long time ago with the grab bucket crane for handling bulk material and electric magnet for handling iron and steel products.

This gradual development of the crane is normal, leading to more and better "automatic handling" and to higher standards of living for all of us. The overhead crane was one of the earliest methods of material handling and, today, is still unequalled for certain specific material handling jobs.

## HANDLING COAL, ASH . . .

(Continued from page 91)

The conical silo bottom may be constructed at 45 to 55 degree from the horizontal, using either concrete slabs or a metal cone coated with bitumastic paint for corrosion resistance. The silo has the further advan-

tages of not requiring a building enclosure, of being inherently dust-proof, and of having an inherently good height-to-diameter ratio for optimum gravity storage. Steel bunkers are sometimes constructed of similar design but their cost is usually somewhat higher both on first cost and maintenance. Catenary bunkers are fast losing their popularity in small plants for reasons mentioned above, and also because of the frequent need to use an extra man for trimming the bunker.

## Pneumatic Handling Eliminates Dust

Pneumatic ash-handling systems, as in figure 5, provide an excellent method for dustless handling of ash and fly ash. Wherever practicable, the installation should be designed to eliminate the need for a basement. An ash-handling job in the basement automatically necessitates an extra man on each shift. The boiler operation can readily control an ash-handling facility from the operating floor. With dump-grate stokers, the ash-system inlets can be located in the operating floor directly in front of each ash-pit door. For continuous-discharge stokers, the ash hoppers can be located in a pit for gravity discharge to the ash system, as shown in Fig. 6. Hoppers designed for a four-hour storage of ash will limit the ash-system operation to twice a shift. In this arrangement, it is most important that the grizzly for collecting occasional clinkers be located near the top of the ash hoppers, where the normal flow of ash will not be interrupted. The operator can break up the clinker from the operating floor. Windbox siftings can be easily removed at weekly intervals with the

# "PALITON"

One Large Capacity—  
4,600 lb.—at the  
Same Low Price



Fork Lengths 36"-42"-48"  
Widths 20½" and 27"  
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Threeway Control for  
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NEUTRAL Giving FREE  
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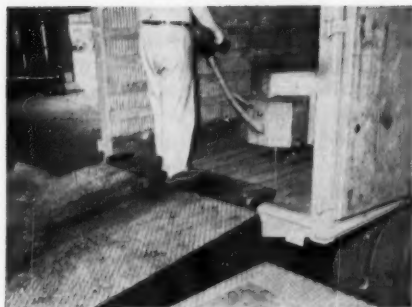
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# BREAK UP TRAFFIC JAMS AT YOUR LOADING DOCKS



**SPEED LOADING . . . INCREASE SHIPMENTS . . . PREVENT ACCIDENTS**

## **WAYNE** *Production-Booster* **DOCK LEVELERS**



If finished products or raw materials are piling up at your loading docks it is time to streamline your materials handling with Wayne Dock Levelers.

**SPEED LOADING and UNLOADING**—Wayne Dock Levelers tilt to any truck bed height. Compensate for any change in height of truck as it is being loaded or unloaded. Speed loading by as much as 75%.

**INCREASE VOLUME PER MAN HOUR**—Wayne Dock Levelers with push-button controls, can be easily operated by one man. No manual labor necessary in lifting or sliding plates.

**ELIMINATE HANDLING and RELOADING**—Wayne Dock Levelers allow material on industrial trucks to be transported directly from shipping department to waiting highway truck. No need to unload and reload.

**PREVENT ACCIDENTS**—Wayne Dock Levelers assure safe, positive ramp connections between shipping platform and highway truck. Ramp adjusts to exact height, throwover plates bridge gap . . . leveling fingers assure positive contact.

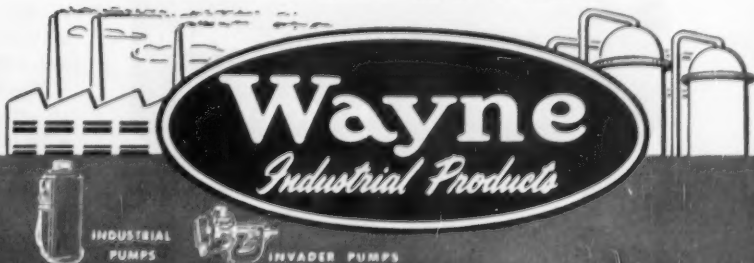
Wayne Dock Leveler is hydraulically operated, powered by air compressor or electric power-pack unit. Speed up your materials handling . . . get the facts on LIFTronics—Wayne's scientific materials handling system.

### **THE WAYNE PUMP COMPANY**

Industrial Division • FORT WAYNE, INDIANA  
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GET THIS NEW BOOK ON HOW  
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DISPENSERS

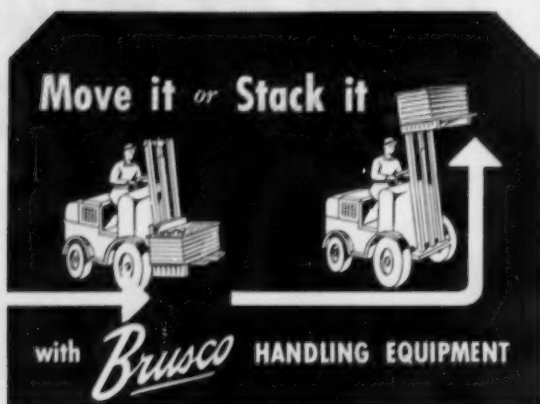


INDUSTRIAL  
PUMPS

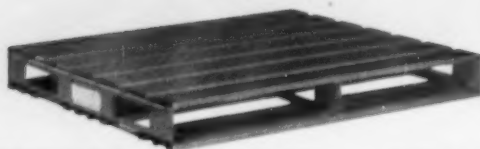


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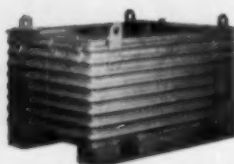




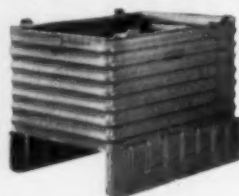
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## HANDLING COAL, ASH

*Continued*

aid of a flexible hose attached to the pneumatic system.

Alloy pipe is used for erosion resistance, particularly in the lines handling bottom ash. Elbows have replaceable wear backs. Suction is produced with a steam-jet exhauster, located downstream of the separators which precipitate the ash out of the air stream. Thus, the ash is deposited in the silo in a dry state. Water sprays on the chute discharging to trucks provide effective control of dust in emptying the silo. An ash conditioner, or dustless unloader in lieu of the water sprays, adds substantially to the capital cost and also requires a skilled operator.

For the same reason that only the hoppers need thawing in most cases of frozen car deliveries, the freeze-proofing of coal bins usually is needed only at the discharge gate. Except in very severe weather, the first few inches of frozen coal will effectively block further penetration of the freezing temperatures into the coal mass.

### Arching Problems In Bins And Chutes

With adequate design of bins and chutes, the uninterrupted flow of fine, wet coal should be no problem, except, again, in the extreme climates where the coal has been severely frozen. Otherwise, slack or carbon sizes of coal containing as much as 10 percent moisture have been handled successfully without the aid of vibrators or poke holes.

The compaction of coal in a bin, due to its own weight, considerably increases the angle at which it will flow by gravity. While the angle of repose may be 40 or 45 deg. the flow angle of coal compacted in a bin will normally be about 70 deg. However, coal that has been completely frozen will act more like cement and other difficult bulk materials which sometimes exhibit flow angles in excess of 90 deg. In such cases, gravity flow must obviously be assisted with special applications of force.

For the condition of a flow angle less than 90 deg., coal will move out of the bin in a manner which has been described as inverted-funnel flow. The column of coal vertically over the discharge gate moves out of the bin and the remainder of the coal rolls into the top of the column and is subsequently discharged. Its lateral movement into the top of the column may be described as a succession of conical depressions, the slope of which is equal to the flow angle.

Arching occurs under either of two conditions. An undersized discharge gate will result in a restricted size of the flow column. Vertical pressure in the column will not be sufficient to overcome the retarding action of lateral pressures from the coal surrounding the column. The other conditions for obtaining an arch occurs when the bottom slope of the bin is steep enough to allow sliding of coal down the slope. A maximum slope of 55 to 60 deg. is recommended to avoid this wedging action.

Minimum recommended size of discharge gate is 16 inches. Obviously, connecting chutes or conveyor must have comparable minimum dimensions. From this discussion, it should be apparent why there is so much



trouble with side-discharge openings in bins—and also why so many bins with undersized gates or excessive bottom slopes are necessarily equipped with poke holes and vibrators.

Flow problems in chutes usually result from insufficient diameter or slope, or from poorly designed transition sections. Minimum chute angles of 55 deg. are usually satisfactory. If it becomes necessary to reduce the chute diameter at some point, or to join two chutes into one, the point of area reduction can produce trouble. Rather than make a long tapering connection and risk wedging trouble, it would appear advisable to make a rather fast reduction in diameter—whereby the tapered collar might help to minimize the wedging effect. Finally, it should be noted that coal left undisturbed in bins and chutes for several days will be compacted somewhat more than during normal operation, and may require manual attention briefly until normal flow is established.

### Protection Against Spontaneous Fires

Coal in storage will oxidize rather slowly at normal temperatures, but if the temperature is allowed to increase above 180 or 200 deg. F., the rate of oxidation will increase rapidly with temperature until visible burning may occur. Water and oxygen combine with the iron pyrites in coal in an exothermic reaction, producing the heat necessary to increase the temperature of surrounding coal to dangerous limits.

Double-screened coal containing a minimum of fines provides adequate ventilation for dissipating the heat generated in the pile. Slack or nut-slack sizes of coal

stored in a bin provide pockets in the voids between coal particles, where the heat of oxidation can accumulate and produce dangerous temperatures if the coal is not moved periodically. Safe long-term storage of coal containing fines can only be achieved in ground storage, carefully compacted to minimize air and water infiltration. This procedure also will control any loss of heating value of stored coal to a negligible quantity.

Thus, it becomes necessary in a bin to minimize any dead areas where coal might accumulate and remain undisturbed for any length of time. A completely self-cleaning bin is not practicable because of the need to keep bottom slopes at an angle less than the flow angle. A certain amount of dead storage is therefore unavoidable.

Experience has shown that, with most coals, satisfactory protection against fires is achieved if the maximum depth of dead storage does not exceed 10 ft. With conical bottoms sloped at 45 or 55 deg. a single discharge gate appears adequate if the horizontal distance from the gate to the bin walls does not exceed eight or nine ft. With square or rectangular bins, the valleys are often a source of trouble. Additional gates might be required in such cases.

### Coal Segregation

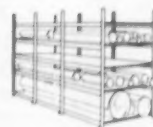
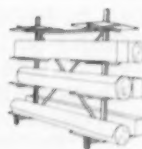
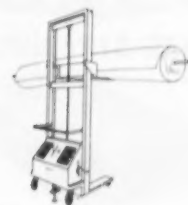
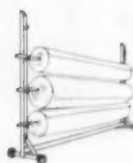
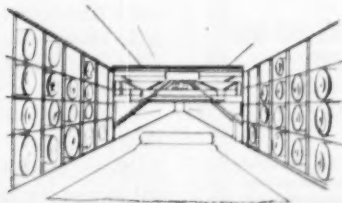
The most important location for controlling segregation is in the filling of the stoker hoppers. Selective filling of one small hopper at a time, as in Figs. 3 and 4, provides good control in this respect. A conical distributor or partitioned chute is recommended for other types of arrangements. Selective filling also can

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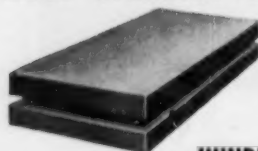
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## HANDLING COAL, ASH

Continued

be used to control segregation in catenary-type bunkers. In vertical storage bins, segregation is seldom a problem of sufficient magnitude to require special filling procedures. However, the filling point should be located vertically over the discharge point wherever practicable, to minimize any possibility of segregation.

### Coal Crushers and Scales

With even the smallest commercial mines equipped for crushing coal to any desired top size, the principal use for crushers might be in breaking up large lumps of frozen coal at plants subject to severe cold weather. Of course, too, in war time it might be that crushers would not be available for new mines being opened. Otherwise, a crusher installed in a plant should be by-passed or the rolls removed to avoid unnecessary reduction of the coal size being ordered.

A boiler meter is a useful and reliable device for indicating whether or not thermal efficiency is up to expectations. Coal-inventory records must be made to correspond with the amount of coal purchased.

Monthly inventories are easily obtained in a plant with adequate bin-storage capacity to avoid frequent handling of coal to and from ground storage. The amount of coal in the bin can be estimated at the beginning of each month, and any difference from the previous month can be applied to the total weight of coal purchased. The maximum probable error in estimating the bin level would seldom affect the monthly records by more than one percent. An automatic scale is the only coal-weighing device which can approximate this degree of accuracy.

### Other Operating Problems

Corrosion and erosion resistance should be provided as necessary to insure trouble-free service for about five or six years. More frequent repairs interfere too much with the boiler-house routine and also add to the maintenance costs unnecessarily. The extra investment cost for further increasing the service life of all equipment components may be difficult to justify in industrial plants where management usually insists on a somewhat greater return on the extra investment than is acceptable in public-utility plants.

Conveyors and some types of chutes which are particularly subject to erosion require a certain minimum thickness of the base metal. If this thickness is doubled, the service life is theoretically doubled, and usually the same applies to the capital cost. However, by limiting the speed of a conveyor and, with some types, the degree of loading, the service life can be extended very appreciably at relatively little increase in capital cost. This is particularly evident in comparisons of actual installations of screw conveyors, where a speed of 60 rpm. and trough loading of 40 percent may necessitate major repairs as often as once or twice a year. At 30 rpm. and 20 percent loading, a service life of 8 or 10 years is not unusual. Similarly, flight conveyors usually give excellent service if limited to a speed of 60 fpm. Provision for shielding the chain from continuous con-

FLOW

tact with the coal may also be necessary, particularly with the bar-flight type of unit.

Bucket elevators are normally very reliable conveyors. However, conservative design again is an important requirement, particularly in view of the problems involved in making repairs to a unit of any appreciable height. The centrifugal-discharge type operates at about 260 fpm and is usually adequate for an elevator height to about 75 ft. For greater heights, the continuous-bucket elevator is usually preferred because of its lower operating speed of 100 fpm. Double-chain construction is recommended only for high-capacity units involving buckets wider than 16 in., the extra chain being required to control the tipping of wide buckets. In all cases, the quality and pitch of the chain must be adequate for trouble-free service. In other respects, bucket-elevator failures are almost invariably traceable to neglect or to excessive rate of coal feed to the elevator boot.

Corrosion protection is particularly important in metal bins or chutes which remain in contact with the coal on a continuous basis. Bitumastic paints, gunite linings, or stainless-clad construction may be applied where necessary to achieve acceptable service life. It is also important to avoid wetting the coal after it is received at the plant as is the case where it might be stored temporarily on the ground or where steam hoses might be used to thaw the coal cars. The amount of moisture available to react with the sulphur in the coal usually determines the amount of sulphuric acid formed. Acid concentration is unimportant because dilute solutions are more corrosive than strong solutions.

## Summary

Summarizing this discussion, the illustration in Fig. 3 incorporates quite a number of the suggestions made for achieving a reliable and economical coal-handling system. The two spreader stokers installed in 35,000-lb.-per-hr. boilers would consume a total of 3.5 tons of coal per hr. at full load. With an industrial process and heating load at any annual load factor of 35 percent, the coal consumption would average 200 tons per week or 10,500 tons per year.

The 210-ton silo will accommodate a week's supply of coal. Similarly, a 25 ton-per-hr. car-unloading system will handle the desired four-day supply of 160 tons in one eight-hour shift including allowance for spotting cars. Capacity of the screw conveyor need only be seven tons per hr., or double the firing capacity.

The 55-deg. metal cone in the silo of Fig. 6 has sufficient slope to avoid spontaneous combustion but not enough to produce arching. The 16-in. bottom opening and comparable size of screw conveyor are also an aid in avoiding arching with wet coal. The screw conveyor and integral feeder are conservatively designed for 30 rpm and 20 percent loading, with overflow chute provided to accommodate the small amount of coal remaining in the conveyor when the end boiler is taken off the line.

*This article has been prepared from a paper delivered at the recent Diamond Jubilee semi-annual meeting of the American Society of Mechanical Engineers, in Boston, Mass.*

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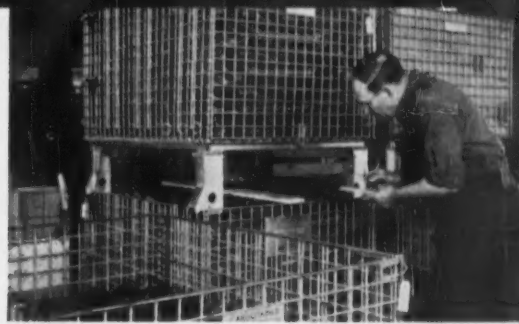
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 STEEL PRODUCTS, INC.  
 2501 Peterson Avenue Chicago 45, Ill.

Please send the complete BULK BIN story

Name \_\_\_\_\_

Company \_\_\_\_\_

Position \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

### Truck Operational Data:

The sixth printing of How to Operate a Lift Truck is off the press by Hyster Company. Designed for easy reading, the booklet uses a two-color cartoon technique, and gives information on operation, maintenance, safety and basic material handling, including drawings for setting up an obstacle course.

Circle 236 on Reader Service Card

### For Continuous Mining:

Brochure from Joy Manufacturing Company contains complete drawing of extensible belt conveyor for continuous mining operations.

Circle 237 on Reader Service Card

### Automatic Batch Weighing:

Technical reference available from Richardson Scale Co. deals with automatic net weighing and tare compensation for traveling batch hoppers.

Circle 238 on Reader Service Card

### Industrial Storage Bins:

Typical installations of industrial storage bins are pictured in a release available from Kalamazoo Tank and Silo Company.

Circle 239 on Reader Service Card

### Handles Any Drum:

How drums of any diameter or height can be handled with the Lift-o-matic Junior is explained in literature published by Marvel Industries, Inc.

Circle 240 on Reader Service Card

### Automated Brewery Warehouse:

Mathews Conveyer Company offers information on an automated brewery warehouse system. Every phase of the operation is covered, from receipt of empties to shipment of fulls.

Circle 241 on Reader Service Card

### Hydraulic Lift Ideas:

Catalog RE-203 from Rotary Lift Company outlines many standard and special uses for Levelator lifts. Design, construction and installation details are included in the literature.

Circle 242 on Reader Service Card

### Container Problem?

Illustrated catalog available from Republic Steel Corporation suggests a variety of containers for standard or special needs. Also detailed are skids, stacking racks and pallets.

Circle 243 on Reader Service Card



**new Baker**

***S*HOVELOADER**

## **saves up to \$400 on initial cost**

Now you can mechanize your bulk handling operations for less than \$10.00 per day for one year . . . much less than you pay a laborer with a hand shovel!

This rugged Model 20 SHOVELoader has a lifting capacity of 1500 pounds, and lifting height of 7 feet. Standard bucket size is 12 cubic feet. Loader arms are in *front* of operator—not around him—protecting him from injury and providing full 360° visibility at all times.

Four forward speeds with top travel speed of 14 MPH make this a *fast* machine and insure better operation on ramps and rough ground conditions.

Bucket tilt-back at ground level means a full load at every grab, and permits low carrying position for travel. Other advantages are longer forward reach, greater longitudinal stability, extremely low maintenance because of easy accessibility of all parts requiring service, and design of the husky, trial-proven engine.

Special attachments are available for special jobs—forks for palletized loads, crane hooks for hoisting, and special buckets for dense materials. Catalytic exhaust system is available for inside work, where required.

Compare these and SHOVELoader's many other features with loaders costing \$350 to \$400 more! Write for complete information. The Baker-Raulang Company, 1219 W. 80th St., Cleveland 2, Ohio.

**Baker**  
**HANDLING EQUIPMENT**

Circle No. 23 on Reader Service Card for more information

55 82



### Electric Door Operator:

Literature from Clark Door Company Inc., describes the latest addition to the company's automatic door line: an electric operator for use with standard inclined track fire doors to widths up to approximately 8 feet. Known as the Fuse-O-Link electric fire door operator, the unit has been designed to provide automatic door operation in doorways equipped with fire doors. By means of a fusible link disconnect device, the operator is disengaged from the door in the event of fire at a temperature setting slightly higher than that of the standard door link.

Circle 244 on Reader Service Card

### Fast, Easy Servicing:

Among the claims made by the Hyster Company for its model RC-150, 15,000 pound capacity fork truck, is fast and easy servicing. A 16-page brochure gives outstanding features and specifications.

Circle 245 on Reader Service Card

### Conveyor Catalog:

Gravity wheel conveyor catalog has been published by Samuel Olson Manufacturing Company. Ease of use and labor saving features are pointed out by the manufacturer.

Circle 246 on Reader Service Card

### Special Belt Constructions:

The B. F. Goodrich Company Industrial Products Division has issued a new data sheet on special conveyor belt constructions. Featured is Riffle Grip conveyor designed to retain or separate water content from the load during belt travel on inclined conveyors.

Circle 247 on Reader Service Card

### Permanent Magnetic Tools:

Single sheet release from Multifinish Manufacturing Company lists seven outstanding improvements in its line of permanent magnetic tools. Twelve various models are pictured and described.

Circle 248 on Reader Service Card

### Explains Automation:

Booklet published by the National Association of Manufacturers cleverly presents an explanation of automation and its potentials. It discusses automations' inevitability and desirability, how it promotes industrial expansion, saves labor and creates jobs. Cost is 10 cents.

Circle 249 on Reader Service Card

### Automated Warehousing System:

A bulk picking method facilitated through the use of an automated conveyor system directed by electronic controls is illustrated and described in a folder available from Walter Kidde Constructors, Inc.

Circle 250 on Reader Service Card

### Variable Speed Transmission:

Technical data including a performance chart and detailed drawings are included in a release from Gerotor May Corporation covering its variable speed hydraulic transmission.

Circle 251 on Reader Service Card

### Magnet Applications:

Availability of a 24 page booklet describing the construction and application of its complete line of electro-magnets is announced by Cutler-Hammer Inc.

Circle 252 on Reader Service Card

### Trolley Efficiency:

New illustrated bulletin from The Rapids-Standard Co., Inc. shows features and uses of Rapistan-Keystone overhead trolley conveyors. Efficiency in transportation, processing, storage, assembly and other phases of production and warehousing is discussed.

Circle 253 on Reader Service Card

## The all new Lewis FIBER GLASS PANEL BOX



so-o smooth  
so-o clean

Fiber glass reinforced polyester panels are smooth . . . cannot snag materials. Joints are tight . . . contents stay clean.

permanent  
molded-in  
colors

Colors never wear off . . . retain their original richness. Neat and mighty, these containers are built for service.

rust-proof  
rot-proof

Repels water, oil, and most chemicals. No warping, cracking, and absolutely shatter proof.

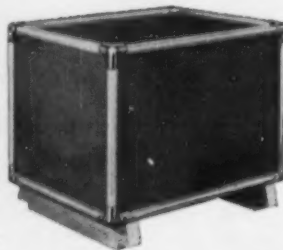
lifetime  
strength

Resilient fiber glass panels have steel-like strength and are framed with heavily plated tubing and dimensional corner irons.

Here's a new, versatile, fast-handling container designed for industrial use wherever a clean, strong and lightweight snagproof box is needed for maximum content protection.

The Plexton fiber glass reinforced polyester panels have strength like steel, yet are lighter than aluminum. The entire box can be easily cleaned with hot water, or even steam . . . panels cannot warp, rust, rot, or become brittle. The panels are also impervious to oil and most chemicals. Interiors are smooth, rivetless, and dust-tight.

These new Lewis Panel Boxes can be supplied with skids for mechanical material handling equipment, or with any style caster for fast, over-the-floor movement. The boxes are shipped from the factory set up, or knocked down for easy assembly in your plant.



### SKID PANEL BOX

#### Standard Sizes:

26" x 18" x 18" inside  
38" x 28" x 22" inside  
48" x 28" x 30" inside

#### Colors:

Available in a variety of rich molded-in colors.

**LEWIS**  
INDUSTRIAL CONTAINERS

G. B. LEWIS COMPANY  
6098 Montgomery St., Watertown, Wis.

Circle No. 100 on Reader Service Card for more information



### Pan Type Conveyors:

Booklet off the press by Simplicity Engineering Company describes their 32 series pan type conveyors, in both the conventional and balanced pan type. Advantages of the units are pointed out.

Circle 254 on Reader Service Card

### Strapping News:

The summer issue of Signode Steel Strapping Company's house organ contains informative articles on export packaging, tells how power strapping equipment is used in Borneo, and describes revolutionary developments in packaging appliances.

Circle 255 on Reader Service Card

### Industrial Sound Systems:

Key functions of industrial sound systems are described in a 12 page booklet available from Radio Corporation of America. Applications of sound and typical equipments are discussed and illustrated.

Circle 256 on Reader Service Card

### Tire Troubles?

If you're having trouble with the tires on your equipment, the latest issue of The Co-Operator, publication of LeTourneau-Westinghouse Co., contains an article on the do's and don'ts for reducing those troubles.

Circle 257 on Reader Service Card

### Reduces Labor Costs:

The Kal-Truck manufactured by Kal-amazoo Manufacturing Company is described in bulletin KT-3 as being built like a tractor to reduce labor costs in material handling. The truck is said to handle bulk materials of almost every description at big savings.

Circle 258 on Reader Service Card

### Variety of Lifters:

Economy Engineering Company shows in its bulletin 54 a variety of lifters, elevating tables and trucks, designed to handle almost any job. Many in-use photos are included in the colorful literature.

Circle 259 on Reader Service Card

### Truck Data File:

A new data file produced by Magnesium Company of America, Tobey Aluminum Division, describes the weight, flexibility and caster advantages of the company's aluminum floor trucks. It includes specifications for the various sizes and styles of flat-bed, multiple-deck and A-frame trucks in the line, as well as information on removable sides, ends and other accessories.

Circle 260 on Reader Service Card

# For jobs that take BIG LIFTS



## LeTOURNEAU builds BIG HOISTS

WITH ABSOLUTE "INCHING" CONTROL

**GOING UP.** LeTourneau Electric Motors (used on all our hoists) develop maximum, full-load power *instantly* when current is applied. No matter how brief the switch contact, during that moment your biggest hoist load will **MOVE**.

**GOING DOWN...** When motor is reversed for powered lowering, regenerative electric braking automatically holds capacity loads to a smooth, safe speed.

**EITHER WAY...** Powerful friction brakes engage the *instant* the switch is released to stop and hold the load exactly where you want it.

**INCHING CONTROL** is the LeTourneau combination of instant torque, instant braking, and controlled lowering speed that permits *absolute control* and *precise spotting* of **BIG LOADS**.

**MATCHED COMPONENT DESIGN**, a LeTourneau Hoist feature, means that all major parts — high-torque motor, welded steel frame and drum, helical gear reduction, heavy-duty contactors and switches — are designed and manufactured by LeTourneau to *work together*. This gives you smoother operation, less maintenance, and more service for your investment in big lifting capacity. Available with any standard mounting, adjustable limit switches for setting upper and lower limits of hook travel.

**CAPACITIES FROM 3 TONS UP** — If you have, or plan, jobs that require **BIG LIFTS**, you'll want to know more about rugged, compact LeTourneau Electric Hoists. Just mail the coupon below for descriptive literature, or write to us outlining your **BIG LIFT** requirements. Your problem will receive the immediate attention of LeTourneau materials handling engineers.

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LONGVIEW, TEXAS  
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## Equipment

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2639 S. MacArthur  
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☐ Please send me literature on LeTourneau Hoists. ☐ I am interested in distributorship for LeTourneau Hoists. ☐ Please have representative call.

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City \_\_\_\_\_ State \_\_\_\_\_ Country \_\_\_\_\_



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several states.  
Write today.

F-110

Circle No. 191 on Reader Service Card for more information

### Engine Hour Meters:

The latest edition of "Meter Talks" published by John W. Hobbs Corporation answers questions about the firm's engine hour meters—tells what they can and will do for your business.

Circle 261 on Reader Service Card

### Strapping Pallet Loads:

A recent issue of "Signode Seal", published by Signode Steel Strapping Company, gives valuable packaging and carloading ideas, as well as information on how to strap pallet loads.

Circle 262 on Reader Service Card

### Engineered Storage:

Many types of racks and containers are pictured and described in the latest literature published by The Paltier Corporation.

Circle 263 on Reader Service Card

### Metalbelt Conveyor:

A sectional metalbelt conveyor of exclusive design, in widths from six inches to ten feet, is described in a brochure published by M-H Standard Company. The conveyor is said to be trouble-free, efficient, durable and safe.

Circle 264 on Reader Service Card

### Conveyor Parts Catalog:

A thumb-indexed, 340 page standard products catalog may be obtained from Link-Belt Company. The catalog contains essential descriptive, dimensional and engineering data for maximum simplicity in selecting Link-Belt standard products for mechanical power transmission, conveying and elevating equipment.

Circle 265 on Reader Service Card

### LP-Gas:

"New, Low Cost Load Power For Your Industrial Trucks" is the title of an informative brochure on LP-Gas conversions for industrial trucks, published by American Liquid Gas Corporation. This company recently developed a series of LP-Gas conversion kits designed expressly for all types of industrial trucks.

Circle 266 on Reader Service Card

### Power Cranes and Shovels:

Bucyrus-Erie Co. describes in a 70-page, 2-color catalog its complete line of excavating, drilling and material handling equipment. Designed for quick reading the catalog features concise copy, condensed specifications and over 100 photo-illustrations of machines on specific jobs.

Circle 267 on Reader Service Card

### Hand Lift Trucks:

Moving and storing of many types of multi-unit loads by Yale pallet hand lift trucks is pictured and described in an attractive 12 page brochure published by The Yale & Towne Mfg. Co. The brochure also features a section describing different pallet types and designs, together with specifications.

Circle 268 on Reader Service Card

### Adjustable Ramp:

Details of a manual floating 10,000-pound-capacity hydraulic ad-illustrated catalog sheet available from Rowe Methods, Inc. Known as the Commercial Adjust-A-Dock, the ramp permits a quick adjustable connection between a loading platform and a highway truck floor.

Circle 269 on Reader Service Card

### Mechanized Tie Handling:

A new color sound film, "Easy Does It", illustrates in detail the latest method of handling and distributing railroad ties along the right-of-way, according to Brainard Steel Division, Sharon Steel Corporation. The new method employs heavy-duty steel strap with a patented seal joint to band ties in tram side lots, which can be distributed singly or in multiple-units.

Circle 270 on Reader Service Card

**YALE achieves  
industrial truck economy**

**with ALGAS  
LP-Gas  
carburetion  
equipment**





1666-E Converter  
UL APPROVED



670 Filter



1400 Series Carburetor

In the field of internal plant transportation equipment, Yale materials handling equipment is widely recognized for its efficiency and advanced engineering. Now, Yale's engineering brings you equipment designed for LP-Gas operation. In selecting the carburetion system for this equipment, Yale made sure that performance and economy of operation were paramount. ALGAS, pioneers in the field of LP-Gas carburetion equipment, is proud of this opportunity to serve Yale and bring better service to industry.

Write us for information on LP-Gas operation for your material handling equipment

Established 1932

**AMERICAN LIQUID GAS CORPORATION**  
1109 Santa Fe Avenue • Los Angeles 21, California

Circle No. 199 on Reader Service Card for more information

### Power Transmission Equipment:

A bulletin which covers The American Pulley Company's complete line of power transmission equipment is available. Brief and informative product descriptions are given, together with illustrations.

Circle 271 on Reader Service Card

### Improved Truck Performance:

The Parkdale Company tells in pamphlet form nine ways you can improve your fork lift truck operation. LP-Gas, plus Beam LPG Carburetion is said to prevent frequent overhauls, excessive engine wear and high fuel costs.

Circle 272 on Reader Service Card

### Transmission Line Kit:

New literature describing RCA microwave transmission line and accessories is available from the Engineering Products Division, Radio Corporation of America.

Circle 273 on Reader Service Card

### Highly Adaptable Dockboard:

Magnesium Products of Milwaukee is featuring its Series T dockboards in a new release. It is designed specifically for wheeled equipment where under clearance is not a problem.

Circle 274 on Reader Service Card

### About Chains and Sprockets:

Stock Roller Chains and Sprockets is the title of a 64-page illustrated book published for distribution by Diamond Chain Company, Inc. It covers a complete line of roller chain stock sprockets.

Circle 275 on Reader Service Card

### Storage Problem?

A colorful new 4-page folder is available from Stackbin Corporation which describes the Stackbin System of storage and material handling. It shows graphically how the system is used to cut handling costs, save space, improve inventory control and minimize loss and damage.

Circle 276 on Reader Service Card

### Steel Handling Equipment:

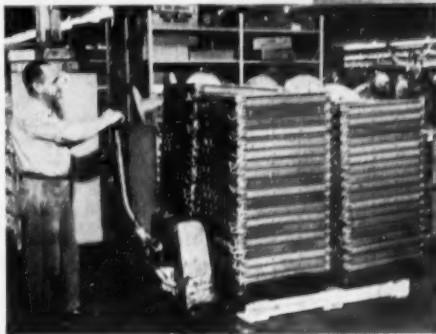
Republic Steel Corporation has published a new catalog, one covering the principal products of its Pressed Steel Division. Included is information on steel boxes, skids, pallets, foundry flasks and stampings.

Circle 277 on Reader Service Card

## ELECTRONICS MANUFACTURER AND KENNETT TEAM UP TO CUT COSTS, SPEED WORK, SAVE SPACE

Assembly operations speeded . . . handling costs reduced with Kennett Receptacles. General Electric Company uses Kennett trays for safe, efficient transfer of sub-assemblies from their Auburn, New York plant to their Syracuse plant. Compact trays replace heavy trucks which cluttered valuable work areas and aisle space. Operator places components in individualized compartments, trays are stacked, removed by fork truck and shipped.

Conveniently grouped for fast assembly. Kennett Receptacles filled with sub-assemblies are arranged so operator can remove part, make assembly, and place completed job in receptacles on his right. Trays are then switched to other stations until final assembly area is reached. Kennett Receptacles were chosen because of the toughness and resiliency of National Vulcanized Fibre. The manufacturer now has receptacles built for years of hard service without maintenance or replacement problems . . . giving maximum protection for work in process.



Trays permit storage of maximum number in minimum space. The engineered design of Kennett Receptacles allows them to nest snugly and stack easily for handy transport, reducing number of inter-plant trips required. Pallet loads shown here are ready to be shipped for refilling at sub-assembly plant. Kennett Receptacles can be designed to suit specific needs and solve special handling problems.

Kennett Receptacles are available in a wide variety of sizes, shapes and designs. The system to fit your needs can be recommended by your nearby Kennett Materials-Handling Specialist. Ask for his name and phone number when you request your free copy of our Catalog 54.



### NATIONAL VULCANIZED FIBRE CO.

WILMINGTON 99, DELAWARE

In Canada: National Fibre Company of Canada, Ltd. • Toronto 3, Ont.

Please send by return mail, without obligation

- ☐ New, free Handling Equipment Manual (Catalog L)  
☐ Name and phone number of nearest Kennett Engineer

NAME \_\_\_\_\_ TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

STREET \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

Circle No. 68 on Reader Service Card for more information



## Tunnels for Safety



**DAZZO DOCK SHELTERS**


Provides a foldable tunnelled passageway between building door and truck or freight car door.

Protects your loading dock loaders and merchandise against rain, sleet, snow or driving winds.

Eliminates accidents and loss of traction, due to wet and slippery conditions.

Protects against changes in temperatures when doors are opened for loading.

TRUCK MODEL



**DAZZO PORTABLE FREIGHT CAR DOOR RAIN CUTTERS**

Prevents rain or melting snow from sliding off car roof onto door opening . . . thereby avoiding wet and slippery dock boards.

Models for all types of cars

Write for literature . . . specify your requirements to Dept. F

Portable Door RAIN CUTTER . . . additional

RR SIDING MODEL

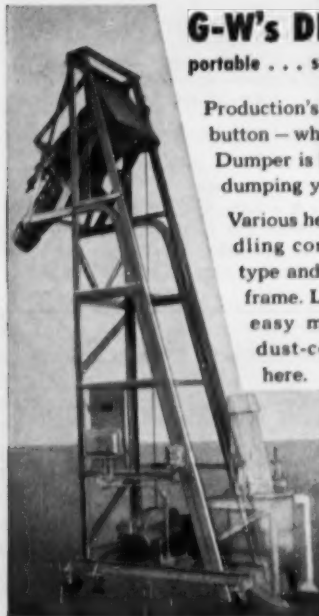
\*Pat. Pend.

**DAZZO PRODUCTS, INC.**  
152 Bleecker Street • New York 12, N. Y.

**All you lift is your finger!**

**Production UP—costs down with**

**G-W's DRUM DUMPER**  
portable . . . semi-automatic . . . strong



Production's up—with the press of a button—when a rugged G-W Drum Dumper is lifting and automatically dumping your drums.

Various heights to suit specific handling conditions. Units for any type and size drums. Heavy steel frame. Long-life truck casters for easy moving. Available with dust-control spout, as shown here.



**FREE!**  
Write for G-W's idea book on engineered materials handling systems.

**GIFFORD-WOOD CO.**  
HUDSON, N. Y. AND PRINCIPAL CITIES

Circle No. 71 on Reader Service Card for more information  
128

## WHEEL STANDARDS . . .

(Continued from page 92)

**Tensile Strength:** The tensile strength of the tread as received shall be not less than 2,000 psi for molded-on tires. After being subjected to accelerated aging process, the decrease in tensile strength shall not exceed 25 percent. The accelerated aging of rubber shall be conducted at 70°C (158°F) for 168 hrs. in air oven process described in Federal Specification ZZ-R-601.

**Durometer Hardness:** The hardness of the tread as received shall be 70 points plus or minus 5 points as measured on the face of the tread by the Shore Type A Durometer. After being subjected to the accelerated aging process described above, the hardness shall not increase by more than 10 points.

**Adhesion:** The force necessary to separate the soft tread from its base shall not be less than 50 pounds per inch of tread width at the base of the tread when tested as follows:

Adhesion tests of rubber treads molded to metal shall be conducted at room temperature. The tread shall be cut transversely down to its base. The tread may be trimmed down to the base along the flanges to minimize tearing of the tread. With the wheel supported horizontally on free rotating bearings in a suitable fixture, the tread shall be separated circumferentially from the base (by means of a suitable testing machine exerting a radial pull) at the rate of approximately 6 inches per minute.

Upon examination at the conclusion of the test, the material pulled off and that remaining on the core shall show no indication of blistering or porosity.

**Elongation:** The elongation of the soft rubber treads as received shall be not less than 250 percent. After being subjected to the oven test, as described under paragraph A (Tensile Strength) the decrease in elongation shall not exceed 25 percent.

**Compression Set:** The permanent set under a deflection of 25 percent of the original thickness of the test specimen, shall not be more than 50 percent. Tests shall be conducted according to Federal Specification.

**Electrostatic Conductive Wheels:** Electrically conductive wheels shall be of such composition and/or material so that when the wheel is subjected to a load of 25% of the recommended standards, the average electrical resistance of the wheel shall be less than 250,000 ohms and the maximum individual electrical resistance readings shall be less than 1,000,000 ohms.

**Method of Testing:** The surface of the wheel shall be cleaned by any method which removes wax and dirt but does not abrade or change the surface of the tread. After cleaning the surface of the wheel, it shall be dried and conditioned at ordinary room temperature and at a relative humidity of less than 80% for at least 24 hours. The wheel shall be tested while supporting a load equal to 25% of its capacity. The wheel shall be tested on a clean, dry flat metal plate. One electrode shall be attached to the axle or hub of the wheel. The second electrode shall be attached to



the flat metal plate. The resistance between the electrodes shall be measured by any resistance apparatus of suitable range which has an open-circuit (DC) of approximately 500 volts. For safety of the operator, the maximum current which can be delivered by the apparatus through a resistance of 500 ohms should be less than 10 milliamperes. Measurements shall be made on five separate areas of the tire or wheel successively in contact with plate, and the average and maximum values shall be determined.

Notes: 1. Load ratings are maximum for ease of operation and are based on ideal operating conditions.  
 2. Adequate means for lubrication shall be provided.  
 3. Additional sizes may be considered which are standard or peculiar to trailer types or caster wheels..  
 4. Federal specifications for molded-on industrial wheels may be procured from:  
 General Services Administration Region Three  
 Regional Office Building  
 7th and D Streets, S. W.  
 Washington 25, D. C.

### Metal Industrial Wheels

These wheels, also known as semi-steel, alloy or pressed steel types, are commonly used on four-wheel hand powered industrial trucks, four-wheel trailer-type industrial trucks, two-wheel hand trucks, casters, conveyors, or any type of industrial or movable equipment wherein loads and speeds are within the specified limits.

### Wheel Requirements

**Construction:** The metal wheel casting or stamping shall consist of a good grade of semi-steel, malleable, aluminum or sheet steel, and shall be so de-

signed to give sufficient strength to resist shock impacts with a good factor of safety, in accordance to the specification for maximum operational load rating and speed.

**Standard Testing Procedure:** Wheels are to be tested in normal (70°F) temperature conditions under recommended load at not more than the recommended speeds. In testing procedure, wheels may be exposed to obstructions, such as irregularities in floor surfaces, as wheels may be exposed to in normal service. High accelerated test methods are not recommended or reliable in determining final results.

### Plastic Industrial Wheels

These wheels can be used on four-wheel hand powered industrial trucks, four-wheel trailer-type industrial trucks, two-wheel hand trucks, casters, conveyors, and any type of industrial or movable equipment wherein loads and speeds are within specified limits. They are suited for installations that are exposed to dilute solutions of organic acids, but are not recommended for (1) rough outdoor service over cobblestones, car tracks, cinders, or similar surfaces; (2) factory service over diamond grid floor plates, steel mesh, or floors of like character; (3) use as friction wheel drives or as drive wheels on industrial trucks; (4) alkali.

### Wheel Requirements

**Construction:** The approved plastic wheel shall be so designed and fabricated from materials of suf-

Join the many firms Speeding Production and cutting costs . . .

## PUT SPEEDWAYS ON YOUR PRODUCTION TEAM

### the new SPEEDLIFT



- elevates from either end
- versatile
- lightweight
- adaptable

Speedways versatile portable power belt conveyor loads, bridges, unloads, stacks and acts as a conveyor line booster or assembly line unit . . . all with the same consistently high degree of performance. Either end elevates from controls at the center to a 30° incline, and it can be set horizontally from 22 inches to 5 feet off the floor. SpeedLift will go anywhere in your operation and one man can do all the work of moving, adjusting, setting-up or storing it.

Built to give long years of service, lightweight SpeedLift's features are usually found only in the most expensive equipment! Yet, SpeedLift is priced amazingly low.

### ALUMINUM GRAVITY WHEEL CONVEYORS

#### SUPER

Light  
Portable



Stronger, lighter, more adaptable than steel, Speedways Aluminum Gravity Wheel Conveyors save you money because one system will do double-duty throughout your plant. They are made from high-quality aluminum alloy which permits a live load of 850 lbs. per 10 lineal feet . . . and the smallest man in your plant can move them wherever needed. Adaptable to a variety of uses, Speedways Aluminum Gravity Wheel Conveyor's non-sparking frames help reduce fire hazards — make for better house-keeping, and because they are rust-proof, may be used outdoors in all weather.

These important performance features add up to big savings in your production set-up . . . savings in cost . . . labor . . . time.

There is a Speedways Conveyor to Suit All Your Needs

Let the Speedways Conveyor line be the answer to lower production costs. See your nearest Speedways Distributor soon or write:

**SPEEDWAYS Conveyors, Inc., 202-208 Rhode Island Street, Buffalo 13, N.Y.**  
 IN CANADA: Speedways Conveyors Ltd., 61 Walnut Street, Fort Erie, Ontario

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## AUTOWEIGHTION

BATCHING • FILLING • CHECKING  
AUTOMATICALLY BY WEIGHT

COMPLETE SYSTEMS ENGINEERED AND PRODUCED

WE CAN SOLVE YOUR INDUSTRIAL WEIGHING PROBLEMS  
WITH AUTOMATIC, SHOCKPROOF THAYER-PLATE SCALES.  
INQUIRE ABOUT FREE ENGINEERING SURVEY

THAYER SCALE & ENGINEERING CORP., ROCKLAND, MASS.

## WHEEL STANDARDS

*Continued*

ficient strength to withstand high static loads and reasonable high shock resistance under normal operational recommended loads and speeds.

### Testing Procedure

**Scope:** For wheels made of plastic materials.

**Requirements:** (a) Floor protective qualities combined with high load capacities; (b) shock resistance; (c) resistance to certain chemical conditions; (d) spark proof.

**Permanent Set:** A test dolly shall be equipped with four casters of the same size and loaded with weights to give a total weight equal to the total load rating of the four wheels. The loaded dolly shall stand 8 hours on a smooth concrete floor in a room maintained at a temperature of 100°F. After test, the caster or wheel shall not be measurably deformed or damaged.

**Floor Marking:** A test dolly shall be equipped with four swivel casters of the same size and wheel style and loaded with weights equal to four times the load rating of the individual wheel less the weight of the dolly. The dolly shall be moved back and forth 6 revolutions of the wheel at 4 mph on smooth, clean concrete or hardwood. The wheel shall leave no mark, visible to the normal eye, on the floor.

## Rate Your Trucks For QDC\* In 12 Seconds!

	Yes	No
Do they start and roll easily?	<input type="checkbox"/>	<input type="checkbox"/>
Are parts quickly, easily replaced?	<input type="checkbox"/>	<input type="checkbox"/>
Do they withstand years of abuse?	<input type="checkbox"/>	<input type="checkbox"/>
Are they designed for YOUR job?	<input type="checkbox"/>	<input type="checkbox"/>

Just one "no" in this check chart for "Quality Design and Construction" means you're not getting the economies offered by Nutting trucks. Dependability, minimum maintenance and ease of operation are *always* the result of QDC. And QDC is the result of 64 years experience in the manufacture of floor trucks!

**Nutting TRUCK & CASTER COMPANY**

1609 Division Street, Faribault, Minnesota

Since 1891

EXPORT SALES REP: School International, Inc., 4237 N. Lincoln Ave., Chicago 18, Ill.

For all the facts call your Nutting representative . . . he's listed under "Trucks" or "Casters" in the yellow pages. Or write direct for the Junior Catalog.



## STANDARD NESTIER BOXES and BASKETS FOR SPECIAL JOBS

Nestiers are mass produced in three standard sizes. They nest to save space.

Filled, they tier with contents of each unit visible and accessible.

We guarantee that replacement with Nestiers will reduce your handling costs regardless of whether you transport small parts by hand, pallet or conveyor.

**NESTIER**

WRITE NOW  
FOR DETAILS

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**FLOW**

### Method of Testing

**Impact:** Minimum impact strength of materials used must meet 1.8 on the Izod  $\frac{1}{2} \times \frac{1}{2}$  in. notched bar, tested facewise under ASTM method D-256.

**Water Absorption:** Specimen to be cut parallel to a cord of the wheel  $1 \times 1 \times \frac{1}{4}$  with all skin removed to be submerged in water 24 hours at 23°C. Maximum water absorption not to exceed 2.5 percent as tested under ASTM Specification D-570.

**Abrasion Resistance:** Abrasion resistance is an important factor and should be tested according to ASTM Tentative Methods of Tests for Resistance to Abrasion of Plastic Materials, Designation D-1242-52 T; Procedure B.

**Compressive Strength:** (a) Tests shall be conducted in accordance to ASTM Specification D-695-52T; Preferred Specimen of 5 (a); (b) specimen shall be in accordance with procedure detailed under impact, above; (c) minimum compressive strength must equal 20,000 psi.

**Heat Resistance:** These materials show severe decrease in physical properties when used at temperatures above 200°F and consequently must be used with caution under any elevated temperatures.

**Chemical Resistance:** Particular plastic compositions are resistant to particular chemical combinations and it is recommended that individual tests be made to determine which type of compound should be used.

**Electrostatic Conductive Wheels:** Electrically conductive wheels shall be of such composition and/or

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## WHEEL STANDARDS

*Continued*

material so that when the wheel is subjected to a load of 25% of the recommended standards, the average electrical resistance of the wheel shall be less than 250,000 ohms and the maximum individual electrical resistance readings shall be less than 1,000,000 ohms.

**Method of Testing:** The surface of the wheel shall be cleaned by any method which removes wax and dirt but does not abrade or change the surface of the tread. After cleaning the surface of the wheel, it shall be dried and conditioned at ordinary room temperature and at a relative humidity of less than 80% for at least 24 hours. The wheel shall be tested while supporting a load equal to 25% of its capacity. The wheel shall be tested on a clean, dry flat metal plate. One electrode shall be attached to the axle or hub of the wheel. The second electrode shall be attached to the flat metal plate. The resistance between the electrodes shall be measured by any resistance measuring apparatus of suitable range which has an open-circuit direct voltage (DC) of approximately 500 volts. For safety of the operator, the maximum current which can be delivered by the apparatus through a resistance of 500 ohms should be less than 10 milliamperes. Measurements shall be made on five separate areas of the tire or wheel successively in contact with plate, and the average and maximum values shall be determined.

## FORK TRUCK EFFICIENCY . . .

*(Continued from page 101)*

On abnormal conditions as the above, a check-up was made the next day to verify activities. Any explanation was then entered directly on the waxed disk so that a record was kept. In the case cited above, an extensive transfer of parts was made from the graveled yard to a concrete area and all fork trucks were busy making long hauls between the areas.

The many recommendations which might be made after studying the four curves for each truck can be included in the following five:

1. Cut down long hauls.
2. Plan work so loads are carried both ways on a trip.
3. Supplement the regular job with work which keeps the truck working the full day.
4. Utilize air-rights.
5. Train operators in the most efficient methods of handling trucks.

## Conclusions

The testing apparatus, which was developed for the tests described in this article, automatically records the amount of time the fork truck is in motion simultaneously with the amount of time the vehicle has a load on its forks. In addition, a record is made of the



miles traveled by the truck.

With computed test-data from this equipment, the engineer can:

1. Detect the degree of dead-heading.
2. Detect the amount of idle time.
3. Detect any unusual fork truck operations, either efficient or inefficient.
4. Compare work-assignments.
5. Provide written evidence for before-and-after tests.

The test-data does *not* permit the engineer to:

1. Distinguish between useful and non-productive work.
2. Determine the number of foot-pounds of work accomplished.

### Collaring Dead Heading

The testing apparatus proved to be an effective check on dead-heading. With concrete evidence, as provided by the test data, it is believed that the engineer can more readily obtain management backing to take adequate steps to combat this wasteful operation.

One of the most effective methods for collaring dead-heading is the two-way radio. It gives supervisors a means of dispatching the fork truck from one job to another with top efficiency.

Another effective method for reducing deadheading is to keep the vehicle in a confined work area. The value of that recommendation was proven in our study by the two comparison tests. Truck No. 1, which operated in an area one-third the size of that assigned to Truck No. 2, had less than one-half as much dead-heading (11.6% compared to 29.1%). To keep fork trucks within their own departmental bays, it is recommended that other types of equipment more suited for long hauls (i.e. trailer-trains) be utilized.

### Idle Time

Reducing idle time is a matter primarily of supervision and employee education. Each time a fork truck operator must leave his vehicle for secondary jobs, the truck becomes a burden on the company. This can be discovered quickly through use of testing apparatus installed on each fork truck in all departments.

If, for example, the tests reveal that one department has idle trucks in the morning and an adjoining department has idle vehicles in the afternoon, then only one set of trucks need be used for both.

### Unusual Operations

The two exceptional cases cited in this article (box-car loading, and wholesale transfer of material) may be compared with normal conditions. A cost-comparison can then be developed which may prove helpful in case the "exception may become the rule."

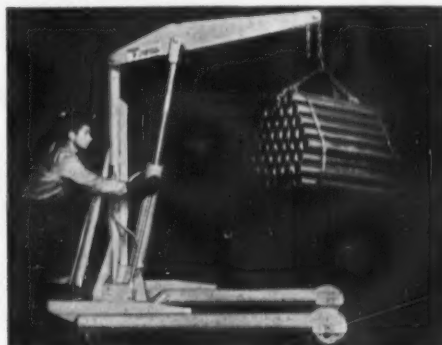
### Work Area and Work Methods

Things to study when attempting to improve work areas are: area size; traffic impedance; obstructions; pavement and ground conditions; load stability; size and type of load; lighting and housekeeping; aisle

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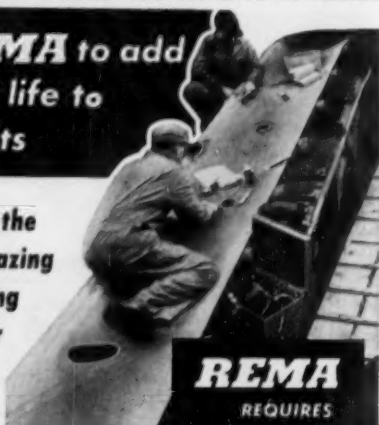
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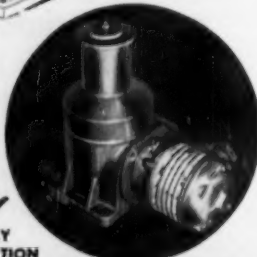


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134

## FORK TRUCK EFFICIENCY

Continued

and doorway restrictions; positions of work stations and storage areas.

Work methods can be improved by better scheduling, dispatching, supervision and operator training. It has been proven that indirect labor incentives can increase the amount of work produced by material-handlers. Incentives properly administered do not entice personnel to abnormal exertion, but instead instill a desire to develop more efficient ways in which to do a job.

### Fork Truck Design

We believe that further improvement in fork truck utilization can be achieved through re-design of the vehicle itself. Functionally, today's fork truck fails to utilize time fully because it must handle its payloads in a position in front of the wheels. The truck is compelled to turn 90° into a unit load before picking it up. To carry the load to another point, it must back-up, turn 90° into an aisle and then proceed to the destination.

It is evident to those of us who participated in the tests that the fork truck of tomorrow should be able to "crab" travel in any direction without turning. It should also be able to pick-up a load from all sides of the vehicle, from ground-level, and raise it to at least a ten-foot level. Here is opportunity for study which should some day pay substantial dividends.

### Comparison of Testing Methods

The advantages of our study's system of testing over that of time-motion study are believed to be:

1. Time of an observer is not required. Studies are made over a four-hour period independently of either a research man or fork truck operator.
2. Special rigs, setups, etc., under controlled conditions (necessary in time-motion studies to simulate actual working conditions) are not required. In no way does the study interfere with the regular job of the truck operator. The vehicle is tested under actual working conditions and the driver is not under the strain of being observed and clocked by a time-study expert.
3. Complete data can be available within one-hour after a full day's testing. Clerical time is less than that of time-motion study. Analysis of results can be geared to the daily work pace of the fork truck.
4. Human judgment is eliminated in recording data in the field. The only human judgment involved is in the compiling and computing of data in the office.

Advantages of our study methods over ratio-time delay sampling are:

1. Ratio-time-delay depends upon intermittent work-sampling. This system, on the other hand, provides continuous work sampling. In ratio-time-delay studies, important operations may be entirely overlooked. The lack of complete informa-

FLOW

tion might have an important bearing on decisions based upon the findings.

2. As in time-motion studies, ratio-time-delay depends upon human judgement while our method does not.

### Limitations of Tests

The inability of the testing apparatus to detect useful work presents the most serious limitation. However, it seems logical that by reducing obvious shortcomings in the operation of the fork truck as pointed out by records of the tests, useful work will be indirectly affected without requiring special attention.

For instance, in order to reduce the amount of time a fork truck travels empty, a "before" series of test runs would be conducted while the truck is on its regular work assignments. Then, steps may be taken to remedy the situation. After improvements have been completed, a second series of test-runs will be made. If the amount of travel time over the area has been reduced substantially when the truck was empty, then it is obvious that less wasteful time was spent in traveling in those same areas when the vehicle was carrying a payload.

A second limitation of the testing apparatus is its inability to provide an automatic means of collecting and totaling actual weights lifted by the fork truck during the day. This information would be of particular value to those interested in knowing the number of foot-pounds handled by the fork truck in a given period of time. For our studies, however, such information was not required.



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# **PACKAGING & SHIPPING SECTION**



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# An Easy Index to This Month's Advertisers

Are you looking for a particular type of packaging and shipping equipment? Listed below are advertisers according to type of product they are advertising in this issue. We have attempted to make your job a little easier by listing them as often as possible. To use this index, find the type

of product in which you are interested . . . turn to the advertisers listed under that product . . . circle the correct numbers on the reader service card, mail it, and you'll get complete information in a jiffy.

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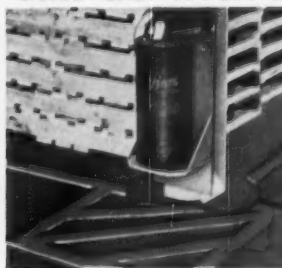
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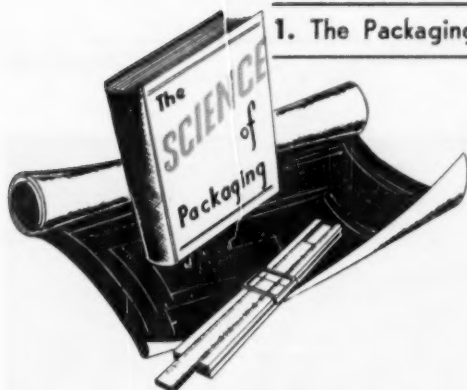
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FLOW (PACKAGING & SHIPPING SECTION)





## 1. The Packaging Engineer

# What is a Packaging Engineer ?



By Earl B. Candell\*

**W**HERE, in all of science, is there another field as broad as that of the packaging engineer? What other scientist must take and apply knowledge from so many other branches of engineering, and from the arts, as well?

Here is a partial list of the types of information the packaging engineer must use in his daily duties:

- Strength of materials
- Physical properties of materials
- Mechanics of machinery and mechanical design
- Material handling
- Time and motion study
- Psychology and the thinking of people
- Transportation
- Distribution
- Warehousing
- Merchandising
- Graphic arts
- Labor relations
- Management

At first glance, the above list may sound over-drawn, but a little thought on each category will reveal where it fits into the Packaging Engineer's scope.

### Strength of Materials

The packaging engineer has at his disposal a tremendous variety of types of materials for use in the

*\*Candell, head of the Packaging Activity for the Lamp Dept. of General Electric Co., is the National President of the Society of Industrial Packaging and Material Handling Engineers*

packages he designs. Containers alone may be constructed of wood, metal, paper, cloth, plastic, fibre-board or any of a number of combinations of the above. An even greater variety is found in types of cushioning and interior packing materials. Each material has its own strength characteristics which must be correctly gauged and applied if packages are to provide proper protection at minimum cost.

An example of how knowledge of materials permits better packaging is found in a comparison of a lamp package of today with one of 1890.

It almost seems that, back when General Electric Co. first started shipping lamps, there was no such thing as "over-packaging." The first shipping containers were massive barrels stuffed with excelsior, bound with iron hoops and padded with packing bustles. Cost of the entire package was completely out of line with the quantity and value of the contained products.

Today's lamp package, on the other hand weighs and costs only a fraction of what the barrel did, and gives completely adequate protection. The outer shipping container for 60-watt lamps, for example, is constructed of 140-pound corrugated board and the inner packs are made of corrugated paper. Lamps are unitized, and yet each is separately contained and individually protected. The advancement from the old "cracker barrel" of 1890 was made possible by the packaging engineer's knowledge of strength and physical properties of materials with which he worked.

### Physical Properties

The Packaging Engineer must know the physical properties of all packaging materials and of the prod-

ucts which are to be packaged, as well. The most obvious example along these lines concerns corrosion. Certain types of metal products must be given special protection against corrosive atmospheres. The protective qualities of different types of wraps, barriers and coatings must be known if the job is to be done well, of course. In addition, however, certain protective materials are known to have adverse effects on certain metals under certain conditions. That is where the Packaging Engineer's knowledge of physical properties of materials is put to the test.

### Mechanical Design

Mechanical design and the mechanics of machines must be applied to packaging problems almost every time a container or package design is contemplated.

For an example, let us return to today's lamp package. The primary pack is a long sleeve which holds two lamps. An ingenious die-cut "tongue" is folded-down into the sleeve to keep the two lamps from touching one another.

In designing that device alone, the engineer had to know, or know where to find out, if a machine was available to do the die-cutting, or if it was possible to develop one economically.

In this case, he discovered that a new machine, embodying an entirely new principle, would have to be designed and built. With the Packaging Engineer working closely with the machinery manufacturer, a continuous rotary die-cutter for single-faced corrugated was developed. Then, the ingenious new sleeve-type package became an economical reality.

### Material Handling and Warehousing

So much has been said and written about the importance of material handling know-how for the Packaging Engineer, that it hardly seems necessary to discuss it at any great extent in this article. The designer



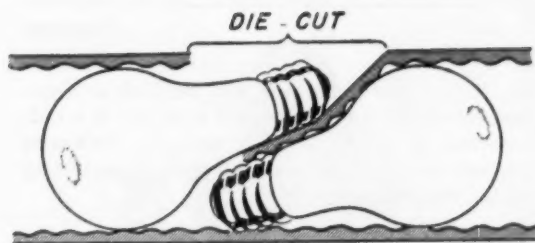
**NEXT-TO-LATEST DESIGN** for 60-watt lamp carton was a six-lamp tube. Individual lamps were placed in single-faced corrugated sleeve as the primary packaging. Unit of sale was found to average 1.7 lamps.

who does not try to make his packages easier to handle, or who does not design into his packages protection against the hazards of rough handling is indeed in the dark ages.

Warehousing problems must be considered with every package, for damage on the shelf continues to take its toll. The new containers for G.E. Lamps were designed with due consideration for stacking weights because, obviously, the product cannot withstand heavy loads. The outer package had to be designed to do the job.

In addition to selecting a corrugated material which is rugged enough to do the job, the Packaging Engineer designed the shipping case with a void over the tops of interior cartons of lamps. Thus, a space was created to allow compression of the container under loads without putting pressure on the lamps.





CURRENT CARTON holds four lamps in two sleeves, each of which holds two lamps. Sketch, above, illustrates die-cut "tongue" which folds down between lamps to keep them separated. Handiness of this package caused unit of sale average to increase to more than three lamps.



### Time-and-Motion Study

A big problem when going to a new package is, "Will the packaging operation which results be as economical as the old tried-and-proven method." Once again, of course, it is a problem of costs. A package which reduces product damage a certain amount, but increases packaging costs a greater amount, is certainly not a successful design.

Time-and-motion studies should be made of old and proposed new methods before a package is adopted.

Returning to the lamp package again, we find another example of the wide scope of the Packaging Engineer's duties. It is necessary to point out here, that all G.E. lamps are hand-packed. With all his ingenuity, the Packaging Engineer has not yet been able to devise equipment which will inspect and package lamps in a single operation. Hand-packing is, therefore, still the most satisfactory and efficient, by far.

First, the lamps are inserted into the two-unit sleeves. Then, two loaded sleeves are slipped into a single-faced corrugated paper tube. That unit is placed into the outer shipping case.

Previously, lamps were packaged individually in single-wall tubes, then placed into larger six-lamp car-

tons which were packed in the shipping container. At first glance, it appears that packing six to a carton might be a faster operation than packaging four to a carton.

Time-and-motion studies were made of the proposed new operation (using samples of the new containers). The entire operation was analyzed. Theoreticals were established and compared with previous standards. It was found that because lamps in the new sleeves were being packed into cartons two-at-a-time, the speed of the new operation was considerably faster than the old. As a result, packers now have more time for inspection of lamps, and, as an added bonus of the new package, quality of the outgoing product has improved.

### Psychology

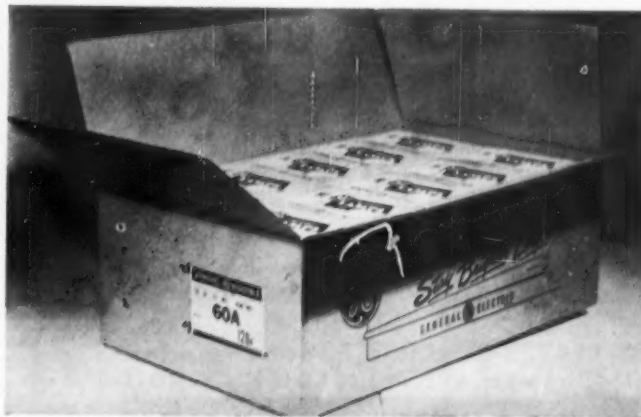
The Packaging Engineer, like all other engineers, must be a super salesman if his ideas are ever to be adopted. He must, first of all, sell his superiors on the economic soundness of any proposal. Then, when it has been accepted, he must sell the machine operators and the packaging personnel on the plan.

In each case, he is dealing with personalities all the

*(More on next page)*

LAMP SHIPPING CONTAINERS in 1890 were massive barrels stuffed with excelsior, bound with iron hoops, and padded with packing "bustles". Ancient photo (left) also shows heavy boxes which superseded the "cracker" barrels.

TODAY'S CONTAINERS are possible because of scientific approach to packaging. Corrugated container is extremely light, inexpensive, and provides adequate protection for lamps.



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## PACKAGING ENGINEER

*Continued*

way. Rare indeed is the man who can look at a proposal objectively if it has been put up to him in a fashion which he doesn't like. The successful Packaging Engineer eventually becomes an expert in psychology and the thinking of people.

### Transportation and Distribution

Before the shipping container for 60-watt lamps was finalized, studies were made of various transportation media. Shipping requirements and freight rates established by carriers were taken into consideration.

It is interesting to note that prior to 1925 the present lamp package would not have been accepted for shipment under freight regulations. In that year, a series of tests were made on corrugated containers and the Freight Classification Committee revised its regulations to permit use of 125-pound instead of previous 200-pound test containers.

To be sure that the shipping package provided adequate protection, but was not excessively costly, vibration and drop tests, under controlled conditions, were made. Also, actual shipping tests were made, each involving 75 to 80 handlings in a shipping circuit.

The size and shape of the shipping case was designed with transportation in mind. It stacks efficiently in both freight cars and motor trucks. Furthermore, when it is in normal shipping position, the inner packs are all in horizontal positions and provide greater protection to lamps.

Distribution practices were important in arriving at the proper number of lamps per shipping container. By adhering to multiples of normal distribution units, the Packaging Engineer was able to help cut distribution costs by reducing "break-downs" of shelf units.

The advent of the supermarket, with practically all storage on its shelves, meant that smaller shipping cases with fewer lamps would be desirable. That, on the other hand, meant increased costs of handling at the factory and at the warehouse. The containers were unitized for efficient handling through all distribution activities up to the retailer where the smaller units can be used to advantage.

### Merchandising

Why was it necessary to change the lamp package, at all? After all, the old package provided good protection and packaging costs were not excessive.

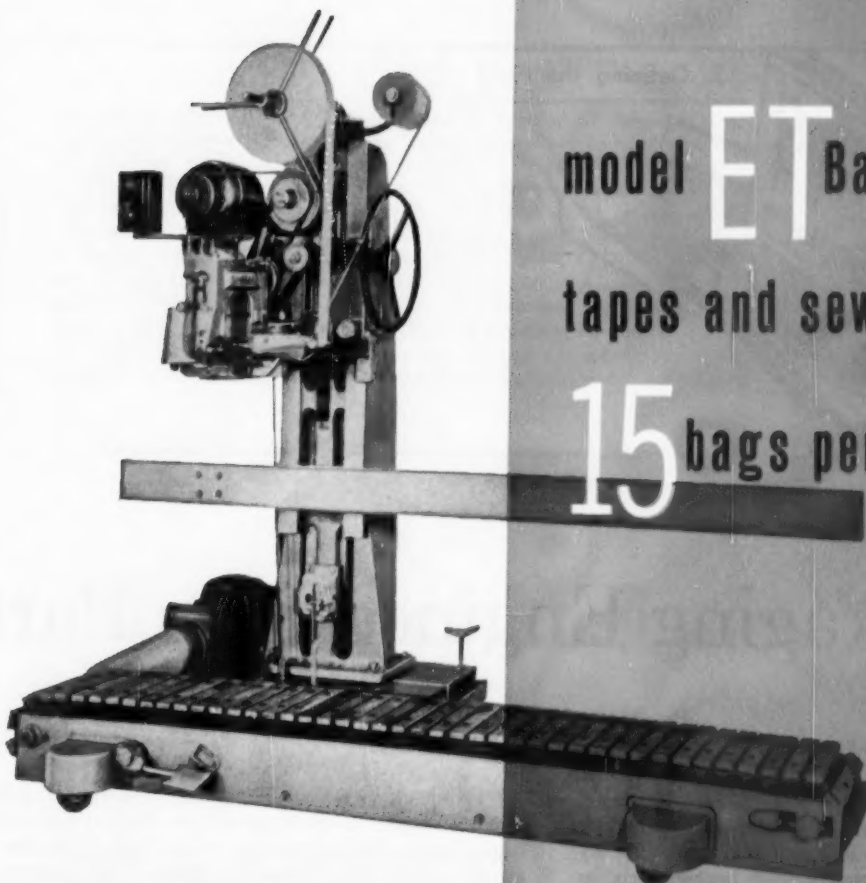
The driving force behind the entire project was merchandising. Again, it was the coming of the supermarket with its streamlined merchandising methods which controlled much of the planning. It was discovered that in self-serve stores, the unit of sale when six-lamp cartons were on the shelf was 1.7 lamps. The carton was a convenience for the stock-keeper, but not for the buyer. It was not a good "selling" package.

With the change to the two and four-lamp units, it is interesting to note, the unit of sale has risen to over three. It appears that six lamps were too many to try

*(Continued on page 171)*

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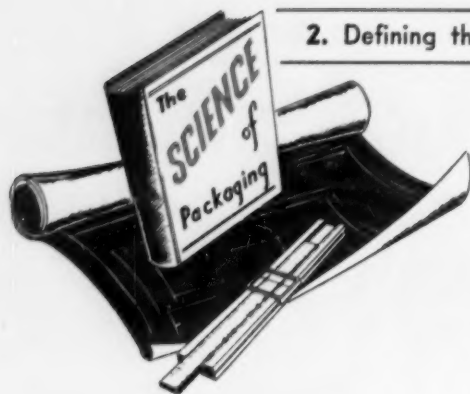
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## 2. Defining the Field

# Packaging Engineering...Part

By Malcolm J. Odell

**T**HE term "Material Handling" has often seemed an unfortunate one to me, particularly where it applies to that function in a scientific sense. In my opinion, the whole field might more appropriately be called "Industrial Logistics," for this term would encompass more generally the preparation and movement of materials to their ultimate destination, as well as the handling of those materials within plants.

Thus, if viewed from the point of view of logistics, with which we all became familiar during World War II, packaging engineering becomes an inseparable part of material handling. Packaging, in itself, means many things to many people. Essentially, however, it is the preparation of goods for physical distribution and marketing to ensure their arrival at the destination in optimum condition. If we grant the accuracy of this definition, the fundamental relationship of packaging engineering and material handling becomes apparent.

Today, we are hearing more about the Packaging Engineer and the Material Handling Engineer. They

are taking on increasing importance as separate, yet integral entities in plant operations. Universities are beginning to conduct courses in this field as an important part of the Engineering Sciences. The practicing engineer, whether he acts as consultant or full-time employee of an industrial concern, must be an artist as well as a scientist, for an art must manifest itself in the engineer's basic comprehension of these logistic relationships. In this article, we shall demonstrate how these relationships manifest themselves from the point of view of packaging engineering.

### Design Considerations

Protection, being the basic purpose of a package, is the prime consideration from the point of view of design. It is not, however, the only consideration. Convenience and economy are vitally important if the package is destined for the customer goods market. In addition, there is the consideration of visual appeal to this particular market. This latter, incidentally, is finding its way more and more into industrial fields as well.

The purpose of this discussion, however, is engineering—we will give little attention to the visual aspect of packaging except to point out that engineering is for naught unless the package is marked to identify accurately its contents.

Depending upon the article to be packaged, from the point of view of protection, the engineer must consider three types of hazards:

**Mechanical**—Rough handling which can occur at any time from completion of the packaging operation,

### The Dictionary Says . . .

**Industrial**—Pertaining to, or of the nature of industry, or productive enterprise.

**Logistics**—That branch of the military art which embraces the details of the transport, quartering and supply of troops in military operations.

Malcolm J. Odell is vice president and a director of Angier Corp. During World War II, he served as "Expert Consultant to the Secretary of War" on packaging and upon commissioning as Chief of Packing and Packaging Section, U. S. Army Service Forces; Chairman, Army Packaging Board; and Vice-Chairman, WPB Container Coordinating Committee. The last year of the war he served as Chief Packing and Packaging Branch, G-4 Division, of the General Staff, ETO. He left the service as a Lieutenant Colonel in 1946. Before joining Angier, he was a partner in the firm of Koehler, Odell and Worden, packaging consultants and later was manager of Adhesive Coatings Division of Dewy and Almy Chemical Co. Prior to the war he was a research and field engineer with Package Research Laboratory, Rockaway, N. J.



## of "Industrial Logistics"

during storage, shipping and up to final delivery to the user.

**Physical Exposure**—Direct rainfall, barometric pressure changes, low temperatures, high temperatures, ultra-violet rays of the sun, etc.

**Chemical**—Resulting from corrosive atmospheres, oxidation, or chemical decomposition (i.e., decomposition of plastic or rubber gaskets from oxidation; rusting or oxidation of steel or iron, corrosion of non-ferrous metals in highly corrosive atmospheres or decomposition of foods because of hydration or oxidation.)

The factor of convenience confronts the packaging engineer with three elements of consideration: (1) Handling—Equipment limitations, as far as the producer, transporter and consumer are concerned, can

never be overlooked in any stage; (2) Storing—Warehousing or stocking on merchant's shelves; (3) Merchandising—Quantity of unit, consumer buying habits, shape, method of closure and method of use of the item must all be considered.

In today's highly competitive world, the factor of economy is so important that it sometimes takes on the aspect of initial cost alone and its other aspects are overlooked. The competent packaging engineer, however, cannot forget that he must design for real economy with the matters of cube or bulk, weight and costs borne in mind. He knows, for instance, that as a rule of thumb, it costs ten times as much to lift an item as it does to move it horizontally.\*

### Design From the Inside Out

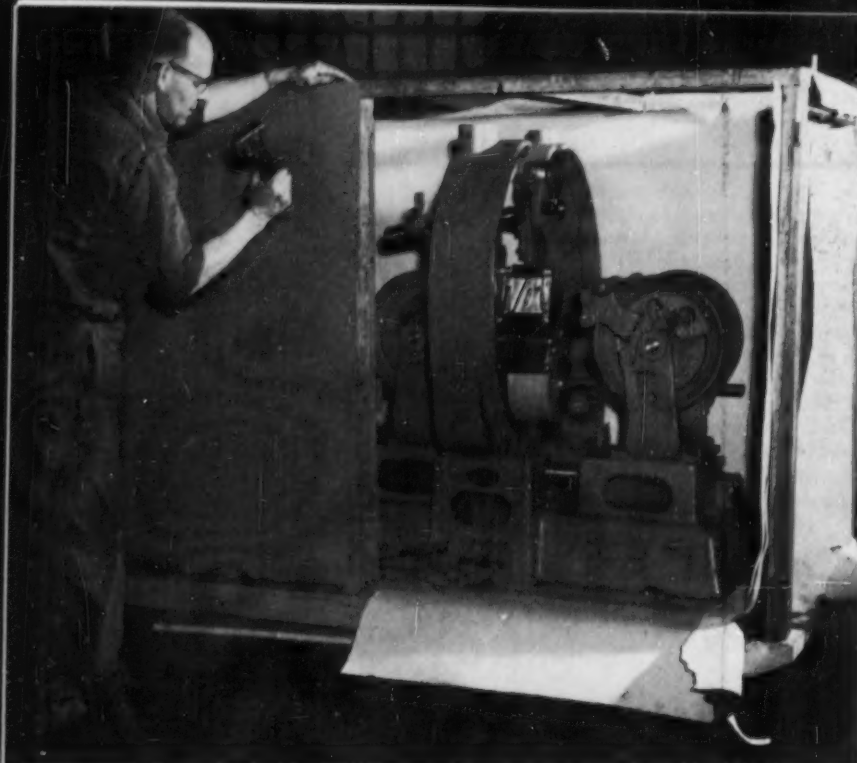
Good package design starts with the item itself. The product designer and the packaging engineer, working together from the idea stage on, make the ideal combination. Many items themselves must be designed with packaging and handling conditions fully taken into account.

A classic illustration was the B-26 Light Bomber of World War II. Tactically and aeronautically, it was an excellent example of military aircraft, but it had a limited range which prevented it from flying to its final destination in global warfare. To prepare the craft for economical shipment by sea was a major task, difficult and time-consuming. It required the removal of the flying surfaces and the engines.

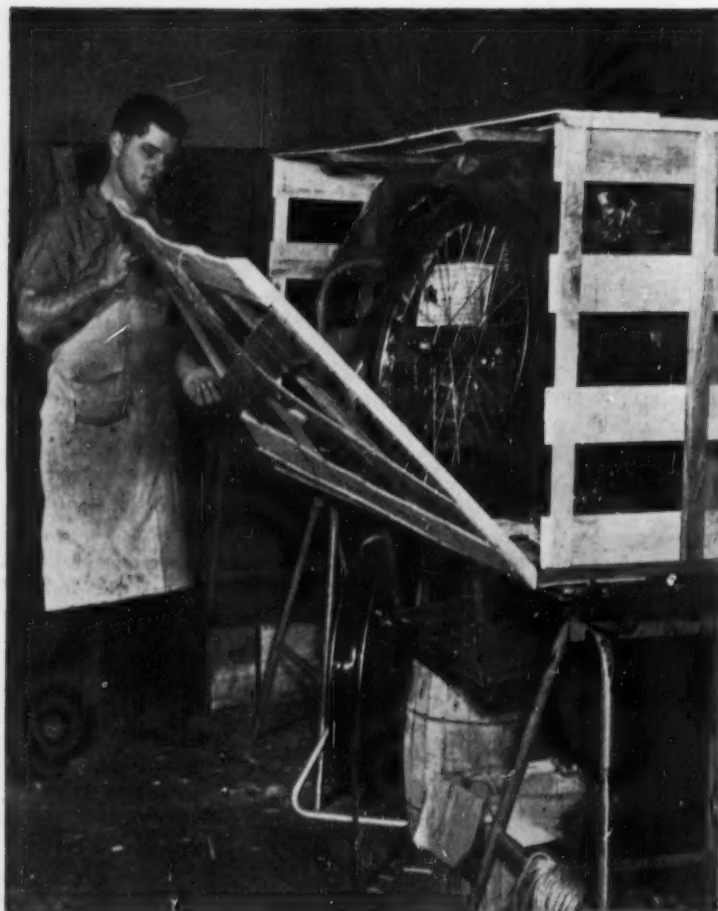
That was only the beginning. At the destination, one-thousand man-hours were required to prepare the plane

*\*Refers to a study conducted by Package Research Laboratory for an automobile manufacturer. A package was developed for shipment of plate glass from the producer to point of use. In studying packaging it was necessary to study the handling methods as well. A careful cost analysis of the entire shipping and handling operation revealed that the cost of moving glass from Pittsburgh to Detroit was almost insignificant when compared to the vertical lifting which was necessary at both ends. Further studies of other types of operations revealed that the 10 to 1 relationship remains approximately constant (from an in-plant point of view) although extra-long distance hauling can change the relationship substantially.*

## INDUSTRIAL



"... PACKAGING, in itself, means many things to many people. Essentially, however, it is the preparation of goods for physical distribution and marketing to ensure their arrival at destination in optimum condition. . . ."



"... PROTECTION, being the basic purpose of a package, is the prime consideration from the point of view of design. It is not, however, the only consideration. . . ."



for combat. Furthermore, the work often had to be performed under extremely primitive conditions. The problem was solved, eventually, through development of disposable fuel tanks which increased the aircraft's range sufficiently for flight all the way to the point of use.

Because the plane had not been designed originally with shipping problems in mind, the Services found themselves in a dilemma of tearing down and re-assembling every B-26 which went into combat. Because of frequent man-power shortages near the front, convenience and availability were sacrificed.

The solution of flying planes to destination was unsatisfactory from a cost standpoint (Rule of thumb for lifting costs compared to horizontal movement costs held true here). The example is an extreme one, but we are constantly surprised by the frequency with which similar situations occur throughout industry.

### Know Handling

There is no room for the ivory tower approach to packaging design. The development of handling methods and equipment must be followed closely and taken full advantage of by the engineer.

The same is true with regard to packaging materials. Changes in equipment and materials are taking place so rapidly that it becomes difficult for any engineer to keep abreast of them. As a result, the average engineer must specialize. He cannot afford to do so to any great extent, however, for fear of losing sight of fundamental developments which constantly occur.

### Functional Considerations

The functional considerations of packaging engineering may be categorized into two major areas—materials and methods. We shall take them up separately:

#### Materials

To provide the proper functional characteristics in a package, there is a vast range of materials from which to make a selection. As contrasted to the very restricted range little more than a generation ago, when lumber, paperboard and simple wrapping paper comprised the list, there is today a variety and abundance of packaging material to fill specific needs.

To have some idea of the latitude which the engineer has in solving his problems today, let us take a brief look at the packaging materials which are available... They fall into four categories: containers and container materials, mechanical protectors, weather barriers, and chemical protectors. Let us take a look at the general list under each category...

#### Containers

Bags - textile and paper  
Multi-wall sacks  
Corrugated and solid fibreboard (partition pack)  
Wood boxes and crates

Boxboard  
Plastic bags  
Bottles  
Cans  
Drums  
Fibreboard and rubber bulk shipment containers

#### Combination Containers

Containers incorporating barriers, inhibitors, etc. as container materials, or in their construction, for special purposes.

#### Mechanical Protective Materials

Cushioning-  
Excelsior  
Corrugated board or embossed paper  
Cellulose wadding  
Mascerated paper  
Rubber  
Foamed plastics  
Spring suspensions  
Wood Dunnage  
Reinforced paper  
Wood flour, etc.

#### Physical Exposure Barriers

Plastic films  
Waterproof paper  
Laminated paper - foil-fibre structure  
Reinforced barriers, paper or plastic  
Spray-on coatings  
Dip Coatings

#### Chemical Protectors

Barriers to gases, oil, water-vapor  
Plastic films  
Foil-film combinations  
Coated and laminated papers

#### Corrosion Inhibitors

Surface coatings  
Impregnants  
Volatile corrosion inhibitors  
Vapors from sublimed solids (moth balls)  
Desiccants  
Spray-on coatings  
Dip coatings

#### Package Closures

Tape  
Glue  
Staples  
Sewn seams  
Nails  
Strapping  
Heat sealing

#### Methods

Packaging is so inherently a part of the physical distribution of goods, that it is difficult to draw the line as to where it begins and ends. To the material handling engineer who has what we might call the "package concept", a ship, truck or freight car becomes simply a mobile container. This concept is an extension or projection of one of the primary functions of a package, i.e.; the grouping of goods to form a unit for convenient and efficient handling. The pursuit of

this idea has brought such developments as unitized loading, box pallets, celled or container pallets, etc.

Other functional considerations which fall within the area of methods, are moving, storing and marketing. The means by which the package is to be moved and handled (by conveyors, overhead equipment, fork trucks, etc.) are involved. The type of storage which the package will encounter from the manufacturer, distributor and the merchant; the inventory identity of the item, plus marketing considerations must also be taken into account.

Considerations such as the marketing method used for displaying the item, display value of the package, customer's convenience and the way in which the customers will use the article cannot be neglected. We recognize them as being of vital importance whether the articles are soap powders or fractional horse-power motors.

## Coordination of Design and Functional Considerations

Efficient packaging is produced by the careful and intelligent coordination of the design and functional considerations. By keeping this constantly in mind, the engineer can do a sound job.

The supplier of containers or packaging materials can be most helpful in suggesting and developing ingenious ways of efficient packaging by observing design and function. Most suppliers maintain laboratories or skilled technical service personnel. These

services, properly used, can be extremely helpful to the packaging engineer.

Further testimony that material handling and packaging engineering are simply branches of a single science is provided by some of the recent developments in containers which combine pallet and package.

One of the first developments along this line is the General Motors corrugated pallet pack. Made of Corrugated fibre board, the container or pallet is a cellular knock-down, re-usable shipping container provided to move a large number of relatively delicate automotive parts from producer to user plants. It is a full pallet-load in itself, designed to be handled by fork trucks and to ensure the individual protection necessary for the parts in storage and transit. It simplifies inventory, packing and unpacking—Parts are expended a layer at a time and, when they have been consumed, containers are knocked down to occupy a minimum of space, collected and returned in carload lots to the parts manufacturer.

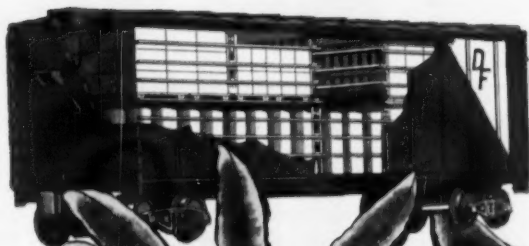
A recent development in unitized loads is a palletless unit for shipment of coil wrapping paper from the supplier to Signode Steel Strapping Co. It was necessary to design two sizes of loads, one for shipment by motor truck, the other for freight cars. The motor truck unit is made up of 43 11-roll bundles of paper arranged in nine layers. Dimensions are 40" x 40" x 74". Each layer except the second, contains five bundles. The second tier has only three bundles, one at each end and one at the center. The resultant spaces provides for fork entry in handling.



"... THERE IS NO ROOM for the ivory tower approach to packaging design today. The development of handling methods and equipment must be followed closely and taken full advantage of. . . ."



"... EFFICIENT PACKAGING is produced by the careful and intelligent coordination of the design and functional considerations. . . . Most suppliers maintain laboratories . . . to accomplish that end . . ."



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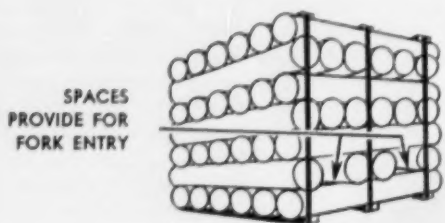
DF cars are in constant demand as more shippers become aware of this "kid glove treatment" for their freight.

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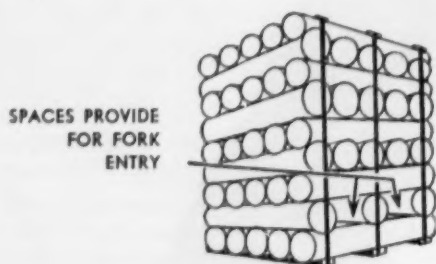


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TRUCK LOAD



FREIGHT CAR LOAD

**SELF UNITIZED LOAD** for bundles of coil wrapping paper is designed in two shapes, one for freight car transportation and the other for motor truck hauling. Each load has provisions for fork truck handling.



The freight car unit load contains 40 bundles arranged in seven layers. The second row contains four bundles (one at each end and two in the center) and all other layers contain six bundles. Dimensions of the entire load are 49" x 49" x 56".

Both loads are bound and reinforced with  $\frac{3}{4}$  x .023 flat steel strapping.

Advancements in the transportation field are of great interest to us. There, the idea of unitized packaging and handling is certainly not new. At least 30 years ago, the Quaker Oats Co. developed handling equipment to pick up and dump an entire carload of grain in a matter of a few minutes. Similar advancements have developed in the handling of coal and ore. Recently, the unitizing of loads by use of strapping, reinforced tape, and reinforced paper have not only made carloading a simple and efficient operation, but have added substantial protection to products by reducing independent movement of containers.

#### Trends

We are all familiar with Union Pacific's transparent car and some of the AAR Laboratory's outstanding developments. We have watched with interest the developments in so-called "Piggy-back" and similar transportation ideas. Such developments are unquestionably going to continue as trends.

Other trends which seem to be developing to significant proportions are part of the major movement in the industrial field toward increased mechanization. This is true particularly in primary packaging operations. For many years a high degree of mechanization has been widespread in the food and pharmaceutical industries. Some of the machinery and techniques for doing packaging mechanically are being adopted in the packaging of industrial supplies and some entirely new techniques are being developed.

With the development of mechanization, completely automatic operation is, of course, simply a logical successor. In the food and pharmaceutical fields, automatic packaging and handling systems have lost much of their novelty. But, the spread into the industrial field will certainly force the growth of mechanical packaging techniques. As part of that growth, a higher degree of standardization seems inevitable.

New products and methods of using them are emerging. In the primary packaging operation, the formed plastic container, utilizing a vacuum forming process of a thermoplastic sheet, has gained greatly in the past year. The development of gummed sealing tapes rein-

(Continued on page 172)

"... THE PACKAGE CONCEPT of the material handling engineer is an extension of one of the primary functions of a package; i.e., the grouping of goods to form a unit for convenient and efficient handling. ..."



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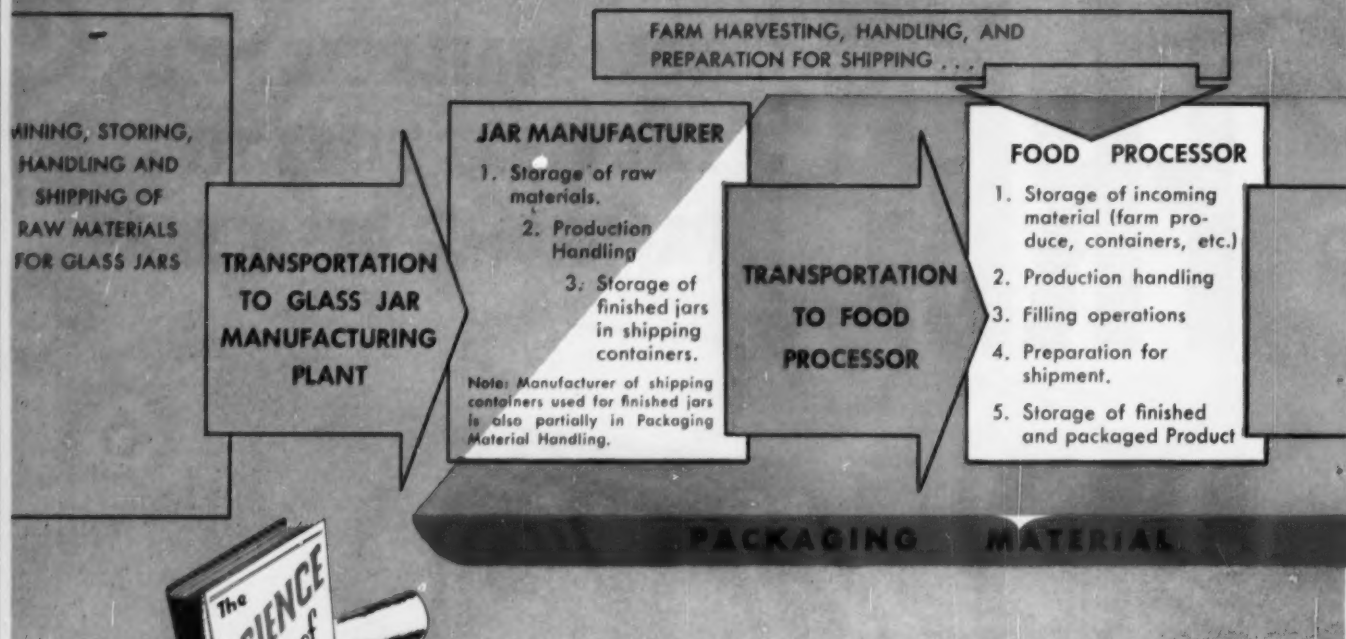
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### 3. Where Does Packaging Fit In?

## The Field of "Packaging Material

by Charles H. Pearce

**I**NDUSTRIAL LOGISTICS" has been defined as a term encompassing all phases of the preparation and movement of materials to their ultimate destination, as well as the handling of those materials within the plant. Within its broad scope there is another, more specific, category dealing with the coordination and integration of operations and equipment necessary to package a product and to deliver it to the consumer.

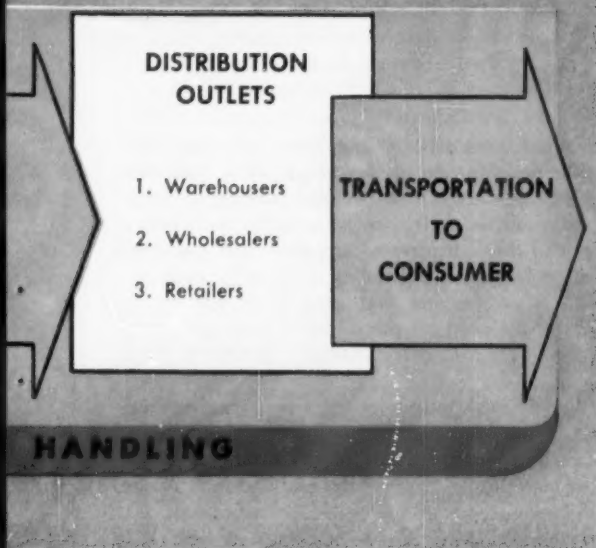
We will identify that category as "Packaging Material Handling", and limit its coverage to a cycle which begins when the fabrication of a container or packaging material is completed by a supplier or converter, continues through the plant where the container is filled, passes through all channels of distribution, including storage, and ends only when the consumer discards or returns the package.

The cycle includes the use of material handling equipment, packaging machinery, carriers and warehouses. The placing of a product into a container falls

into the scope of the cycle; the handling of the product prior to delivery to the packaging line does not.

It is vitally important that the engineer have a clear conception of the packaging and material handling cycle before he plans containers and the packaging activity. To illustrate more graphically, we refer to the activities involved in packaging a food product in glass jars. The cycle begins with the inspected glass container in its shipping carton at the end of the production line in the glass factory. It includes movement via material handling equipment, warehousing and shipping to the food manufacturer's packaging machinery line where jars are filled and closed. It continues to the supermarket and on to the final consumer.

The major objective of packaging material handling is the packaging of a product so as to insure delivery of the enclosed product to the consumer in the best possible condition and at the lowest cost, (with due regard to the attractiveness of its exterior.) To ac-



**PACKAGING MATERIAL HANDLING** for a food product packed in glass jars is illustrated in chart at left. The cycle begins with the inspected glass container in its shipping carton at end of the production line in the glass factory and includes all handling to retailer and final consumer.

## Handling''

comply this objective, it is necessary to understand all elements of the cycle since these elements are interdependent and must be seen in their proper relationship to each other and to the complete operation. For purposes of this article, we have grouped the chief elements of packaging material handling under two categories: (1) Planning for Packaging; and (2) The Package in Storage and Transit.

### 1. PLANNING FOR PACKAGING

Placing of responsibilities for packaging material handling within an organization is an individual problem, the solution of which depends on the size of the manufacturer's company and on the size and complexities of the specific requirements. The problem may warrant a packaging committee to coordinate the problems of packaging material handling with other phases of packaging. Such a committee usually includes representatives of the sales, advertising, legal,

Charles H. Pearce served many years as service and sales engineer, market research analyst and executive in the glass container industry and in the packaging machinery and material handling equipment fields. Since 1951, he has served in the National Production Authority and the Business and Defense Services Administration of the Department of Commerce as an Industrial Specialist.



production, technical, purchasing, traffic and art departments. In some instances there may be a need for the services of a professional packaging engineer to be responsible for the technical phases of packaging material handling as well as other phases of packaging.

Depending upon circumstances, the packaging engineer may be an employee of the manufacturer or an outside consultant. In any event, the importance of packaging material handling today is such that its over-all planning is a task for top management. It requires supervision at a level where containers and other packaging materials problems can be coordinated with the problems of costs, engineering, production, selection of equipment, transportation and storage.

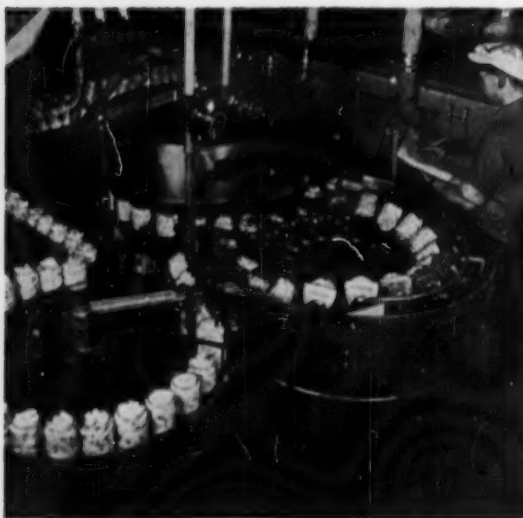
### Package Design

A well designed package should be planned to permit ease of handling, at lowest possible cost, through

the packaging material handling cycle. Laboratory and use tests should be made of the ability of the packaged product to withstand the conditions likely to be encountered throughout packaging material handling. Desired package qualities must be designed for the package by someone who is completely familiar with both material handling equipment and packaging machinery and who has due consideration for such package factors as container material, size, weight, shape, cost and sales appeal.

Before beginning actual design of a new package one should obtain and thoroughly consider information relating to proposed material handling equipment and packaging machinery. Here is a check list which is suggested only as a guide.

1. What specifications exist from Government or business, industry or customer, which may affect the proposed design?
2. What are the limitations of existing material handling equipment and packaging machinery in respect to processing package weights, sizes, shapes and materials?
3. What may be the effect of pallet loading?
4. What are storage conditions?
5. What are shipping conditions?
6. What protective or preservative means are required?



IN THE PACKAGING OPERATION, the packaging line, which constitutes a series of machines properly linked together, is the pivotal point. Equipment must be selected in early stages of container engineering.

## Testing

Much has been written and much is being done about the pre-shipment testing of packages. Manufacturers of containers and packaging materials conduct tests both in their own laboratories and service centers and through private companies that test commercial packaging. Some testing is done by users.

There is no denying that greater recognition by shippers of the need for pre-shipment testing of packaging would reduce further in-transit damage to products.

Well-established testing procedures have been developed by the American Society for Testing Materials. Through its committees, this society promotes knowledge of materials of engineering and the formulation of standard methods of test, specifications, definitions, and recommended practices relating to such materials. Among the committees are those on materials used for containers and packaging and a committee on shipping containers. For example, the scope of the committee on shipping containers includes: nomenclature, definition of terms, test methods, performance specifications and study of the effect of various factors influencing strength and serviceability relating to packaging.

The National Safe Transit Program is an example of a voluntary cooperative program for pre-shipment testing of packaging. In the program, the manufacturer or an accredited laboratory pre-tests the completely



MOVEMENT VIA HANDLING EQUIPMENT is included in the packaging material handling cycle. Empty bottles are boosted by a belt conveyor to a wheel conveyor and into processing room at Borden Cheese Co.



packaged product by performance standards before shipments are made to distributors or dealers. The testing at present involves impact, vibration and drop. Crates and cartons undergo rigid tests to determine their ability to withstand shock. When manufacturers adopt recommended packaging methods, which have been designed to minimize or eliminate the possibility of damage during in-transit handling, their packages are certified by the application of a "safe-transit" label.

### Marking

Proper marking of packages for identification and direction is often essential to efficient handling and prompt delivery. According to estimates, inadequate marking is responsible for more package loss in the United States than any other packaging fault. Routing and direction marking instructions for parcel post, freight, express and export shipments may be obtained from the transportation agencies concerned.

Emphasis should be placed on determining the proper letter size, locations of marking and legibility and durability of markings. Packages that contain fragile products and require careful handling should certainly be so marked. On the other hand, unnecessary marking should be studiously avoided.

### Equipment

In the early stages of developing or selecting the packaging material, thorough consideration should be given to its relationship to material handling equipment and packaging machinery. The designing of the package and the selection of the packaging machinery start together at the planning stage. In the packaging operation, the packaging line, which constitutes a

series of machines properly linked together, is the pivotal point.

Generally, the basic forms of equipment and machinery used in packaging material handling are:

#### Material Handling Equipment . . .

- a. Conveyors and drag lines
- b. Cranes, hoists and monorails
- c. Powered and manual trucks
- d. Equipment for elevating and positioning
- e. Pallets, boxes, skids and racks
- f. Strapping, sealing, marking and securements

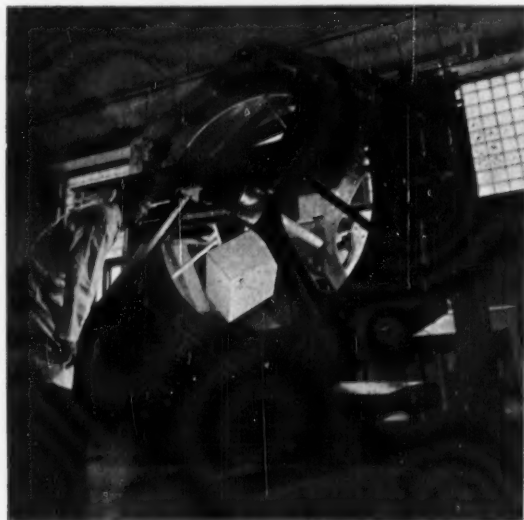
#### Packaging Machinery . . .

- a. Conveyors, loaders, unloaders and unscramblers
- b. Cleaners and washers
- c. Weighers and counters
- d. Fillers and mixers
- e. Sealers, cappers and closers
- f. Wrappers and bundlers
- g. Formers
- h. Labelers
- i. Cartoners and marking devices
- j. Palletizers
- k. Staplers, stitchers, tapers and strappers
- l. Inspection and control devices
- m. Pasteurizers, sterilizers, retorts and freezers\*
- n. Soakers, preheaters, coolers and driers\*

\*Machinery and equipment for cleaning reused containers and processing containers and their contents. It is generally confined to certain food processing industries.

### Plant Layout

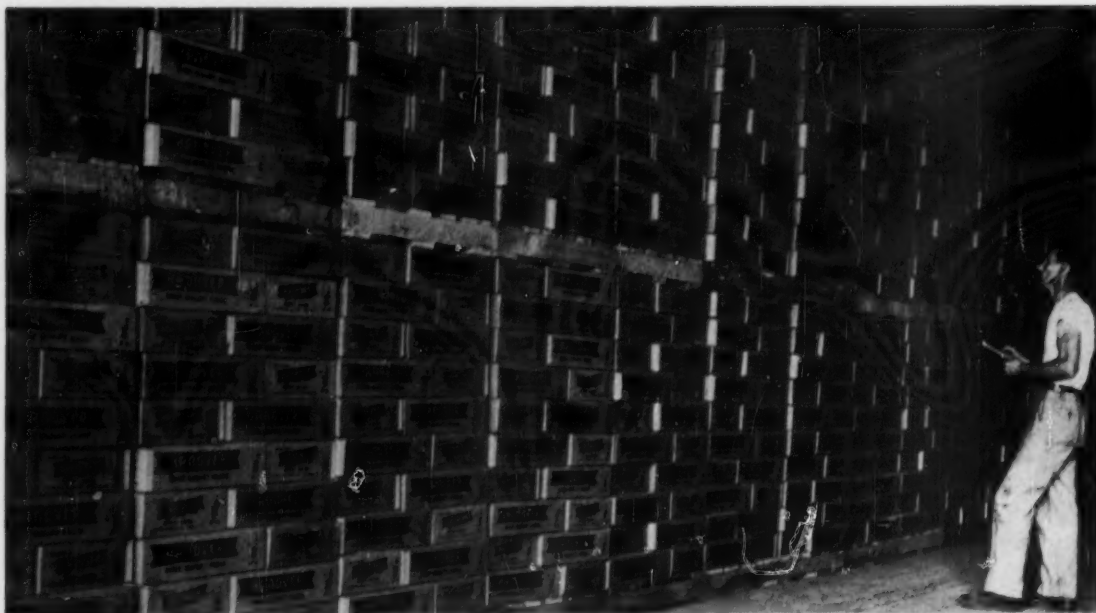
Accuracy in the related planning and scheduling of material handling equipment to and from pack-



**PRE-SHIPMENT TESTING** of packaged products is doing much to reduce in-transit damage to products. Tests like the one shown here simulate conditions experienced in the packaging material handling cycle.



**PROPER MARKING** for identification and direction is often essential for efficient handling and prompt delivery. Case on right was redesigned to expedite inventory-taking and warehouse and stockroom handling.



**ESSENTIAL LINK** in packaging material handling is the warehouse which is geared to steady movement and

rapid turnover of packages. Today, it is described as cu. ft. and handling equipment, not sq. ft. and labor.

## PACKAGING MATERIAL HANDLING

*Continued*

aging machinery is extremely important and, unless effective, can result in retarded production and idle labor. Proper timing relationship involves careful selection and placement of all manually operated, automatic and semi-automatic equipment for efficient

flow from the stockroom through the packaging department to the shipping room. Time and money can be saved by locating fast-moving packaging materials nearest the loading-out point. A well-planned physical layout of the packaging department should be based on the rate of production for the product that is to be packaged, with due consideration to providing space for expansion of operations to meet greater production.

An ideal sequence of planning operations for determination of equipment and plant layout would start first with planning of work volume (rate and quantity of production.) Next to be considered would be methods and equipment (kind and type of packaging machinery and material handling equipment). The final step would be the layout of the packaging department, showing location of equipment and personnel and showing the flow of product and packaging materials.

### 2. THE PACKAGE IN STORAGE AND TRANSIT

Major improvements in the development of storage and material handling facilities and methods have occurred in recent years. The modern warehouse, geared to steady movement and rapid turnover of packages is an essential link in packaging material handling.

Today, warehouses are described in terms of cubic feet and material handling equipment rather than square feet and labor. Much stress is placed on the

*(Continued on page 167)*

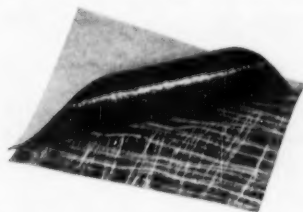


**PALLETIZATION** has and will continue to affect the design and standardization of containers and packaging materials. Palletization is said to increase with increasing competition and rising manufacturing costs.

**If you ship in Boxes now...**



**Take a look "under the hood"  
at rugged, waterproof FIBREEN**



Note the combination of double layers of wire-strong fibers, waterproofing adhesive and paper. So tough you can hardly tear it — yet it's pliable. FIBREEN can take prolonged soaking, heat and cold and rough handling in stride.

Any width available for your particular product! Light and heavy duty, including non-staining grades.

## **A CRATE PLUS FIBREEN**

**Saves You Money!**

Shippers are finding that they can lighten their loads and *lighten their costs* when they ship in crates with contents wrapped in FIBREEN. FIBREEN is rugged, waterproof paper that seals against dirt, moisture, salt and smoke. It's pliable too, wraps quickly, easily, snugly around anything shipped — including products with irregular shapes — furniture, machinery, etc.

*Why not investigate these savings  
in packaging and shipping costs?*



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# S. I. P. M. H. E. Show



## Exhibitors of "Tools" for Packaging Engineers

### Company Booth Number

Aeme Steel Company .....212-219  
 Algene Marking Equipment Co. ....407  
 American Box Company .....211  
 American Excelsior Corp. ....507  
 Armour & Co., Curled Hair Div. ....720  
 Automatic Transportation Co. ....316

Baker-Raulang Co. ....808  
 Big Joe Mfg. Co., Inc. ....600  
 Bischoff Chemical Corp. ....213  
 Blocksom & Company .....708

Cargo Packers Inc. ....805  
 C & D Batteries, Inc. ....412  
 Celotex Corporation ....606  
 Cleveland Container Co. ....409  
 Conveyor Specialty Co., Inc. ....408  
 D. C. Cooper Co. ....800  
 Continental Can Co., Inc. ....612  
 Craig Machine, Inc. ....804  
 Cromwell Paper Co. ....604

Thomas A. Edison, Inc. ....410  
 Elbee Excelsior Co. ....718

Flow Magazine .....205  
 Fox Paper Co. ....312

General Box Co. ....403  
 Jerome F. Gould Corp. ....608

### Company Booth Number

Could-National Batteries, Inc. ....404  
 Adolph Gottscho, Inc. ....513  
 Greenwood Packaging Supply Co. ....510

Hampton Manufacturing Co. ....231

Ideal Stencil Machine Co. ....700  
 Impact-O-Graph Corp. ....710  
 Industrial Packaging .....405  
 International Staple & Machine Co. ....614  
 Iron Works, Inc. ....722  
 Island Equipment Corp. ....221

Jiffy Manufacturing Co. ....400

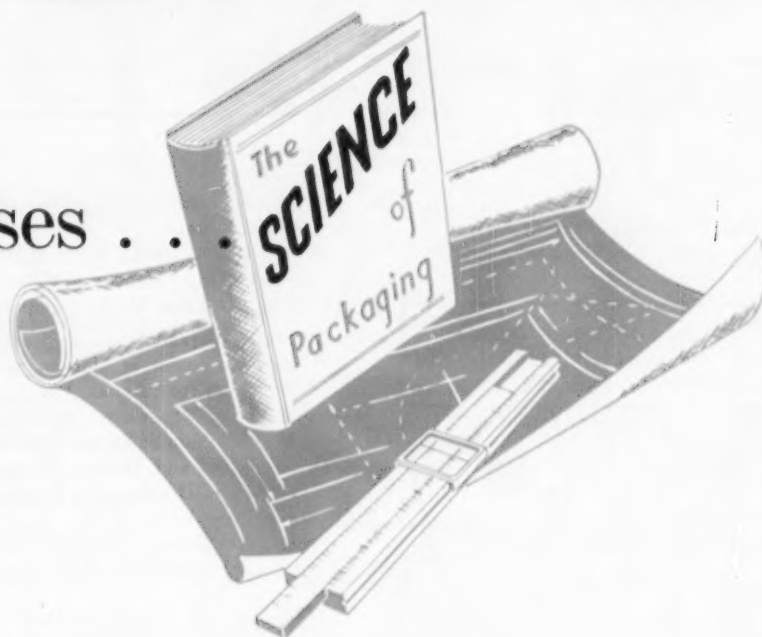
Keyes Fibre Sales Corp. ....707  
 Kimberly-Clark Corp. ....314  
 Kugler Development Corp. ....112-114  
 K. W. Battery Company ....116

M-H Standard Co. ....204  
 M & M Packaging Corp. ....203  
 Markem Machine Co. ....504  
 Market Forge Co. ....300  
 Marsh Stencil Machine Co. ....411  
 Modern Packaging .....714  
 Moto-Truc Co. ....120-22-24

(Continued on page 173)



# Stresses . . .



**R**ECOGNIZING the extent to which the Packaging function has become an integrated science, the Society of Industrial Packaging and Material Handling Engineers will emphasize technical aspects at its 10th Anniversary meeting in New York, September 19 through 22.

The meeting will include three principal events—The Short Course, Exposition, and National Protective Packaging and Material Handling Competition.

All classes of The Short Course will be held at the New York University College of Engineering Campus, 191st St. and University Ave. the Bronx. The exposition, officially designated "The 10th Anniversary Industrial Packaging and Materials Handling Show, will be staged in the Kingsbridge Armory, 29 W. Kingsbridge Rd.

As in past SIPMHE shows, entries in the competition will be displayed in the exhibit area, and awards will be made at the Society's Annual Dinner, the evening of Sept. 21, at the Concourse Plaza Hotel.

## Short Course an Intensive Review

With the co-sponsorship of New York University's Office of Special Services, the SIPMHE Short Course program is divided into four sections: (I) Engineering Principles Review; (IIa and IIb) Applied Packaging Principles and Applied Material Handling Principles, respectively; (III) Management Aspects of Packaging and Material Handling; and (IV) Applied Principles—The Package as a Selling Tool.

**MONDAY, SEPT. 19**

### Section I

**Engineering Principles Review:** Nichols Hall, South Campus; Chairman, John D. Farrington, Jiffy Manufacturing Co., Hillside, N. J.

"Mathematics in Packaging and Material Handling",

by Prof. Sidney G. Roth, Head, University Division of Special Research. This will include three parts:

**A.** Introduction, review of mathematics, and mathematical tricks of the trade.

**B.** Packaging and Material Handling Geometry. This will cover basic formulas, establishment of elemental equations, quadratic equations and their functions; basic plane and solid geometric formulas for areas and volume; static loads versus accelerated and decelerated loads in cargo, stowage, freight, transportation, etc.

**C.** Trigonometry and Logarithms as Related to Packaging and Handling.

### Section IIa

**Applied Packaging Principles:** Philosophy Hall, West Campus; Chairman Frank W. Green, Industrial Consultant, East Longmeadow, Mass.

**A.** Packaging Forms and Materials.

**a.** "Selection and Application of Papers", by F. S. Leinbach, Riegel Paper Co. New York, N. Y.

**b.** "Rigid and Flexible Plastics—Cellular Cushioning", by Albert D. King, Consulting Eng., Frank W. Green Co., E. Longmeadow, Mass.

**c.** "The Packaging Operation in the Smaller Plant", by Edward Schmidt, Vice President, Reeves Soundcraft Corp. Springdale, Conn.

**B.** Special Applied Package Engineering.

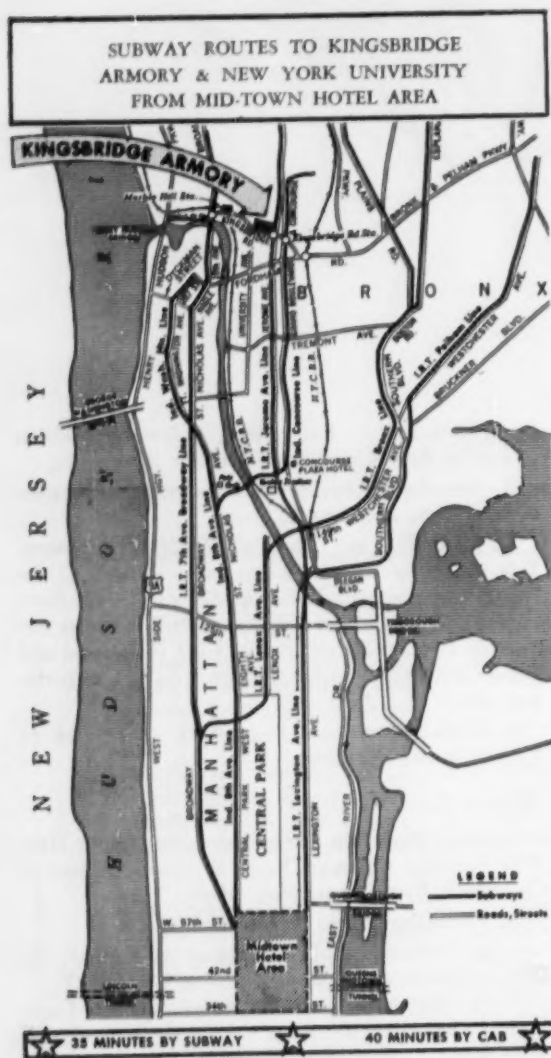
**a.** "Recent and current thinking in Military Packaging", by Raymond A. Norris, Office of the Assistant Secretary of Defense, Washington, D. C.

**b.** "Correlating Laboratory Tests to Application—Field Proving, Analysis and General Evaluation", P. A. Geary, Packaging Development Department, Smith, Kline, & French, Philadelphia, Penna.

(More on next page)

## Section IIIb

**Applied Material Handling Principles:** Gould Student Center Auditorium, East Campus; Chairman,



1. Lexington Avenue IRT Express train marked "Jerome-Woodlawn Express" to Kingsbridge Road and Armory.
2. 6th Avenue IND Express marked "D-Bronx-Concourse Express" to Kingsbridge Road, 3 short blocks west to Armory.
3. 7th Ave. IND Express train marked "East 180th Street" to 149th Street, go upstairs to upper level and take the train marked "Jerome-Woodlawn Express" to Kingsbridge Road & Armory.
4. 8th Ave. IND marked "A", "AA" or "CC" to 59th Street, and change for the train marked "D-Bronx-Concourse Express" to Kingsbridge Road, 3 blocks west to the Armory.

N.Y.U. CAMPUS AT 191ST ST. AND UNIVERSITY AVE.  
8 BLOCKS SOUTH OF KINGSBRIDGE ARMORY - ALL  
SUBWAY ROUTES TO KINGSBRIDGE ARMORY STOP AT  
190TH ST. STATION FOR SHORT COURSE TRAFFIC.

John Mount, Insurance Company of North America, Philadelphia, Penna.

A. "How to Analyze a Material Handling Problem", by J. F. Stilling, Manager, Material Handling and Packaging, Reynolds Metals Company, Richmond, Va.

B. Material Handling in the Small Company.

a. "Equipment in Motion, Standardization and Flexibility", by John Bayuk, Plan Engineer, Lycoming Division, Avco Mfg. Corp. Stratford, Conn.

b. "Selection of Proper Equipment Types—Profitability Index and Human Relations Aspects", by Raymond Reul, Development Engineer, Food Machinery Corp. New York, N. Y.

c. "Multi-Story Buildings", by Frank Ganung, Raybestos Div., Raybestos Manhattan Corp., Stratford, Conn.

d. "Warehousing", by Prof. George D'Diorne, Rutgers University, New Brunswick, N. J.

TUESDAY, SEPT. 20

## Section I

**Engineering Principles Review:** Nichols Hall, South Campus; Chairman, John D. Farrington.

"Physics of Packaging and Material Handling" by Dr. Yale K. Roots, Associate Professor of Physics, College of Engineering, New York University.

a. Basic Fundamentals of Physics and Their Relations to the Packaging and Material Handling Field.

b. Physics of the Static State

c. Physics of the Dynamic Condition

d. Special Problems in Physics as they relate to Packaging and Material Handling.

The above lectures will review basic energy principles—such factors as displacement, acceleration, lever principles in strained moments, and stress and strain principles; co-efficients of expansion and friction; vibration, insulation, conductivity; and evaluation and principles of temperature.

## Section IIa

**Applied Packaging Principles:** Philosophy Hall, West Campus; Chairman, Frank W. Green, Industrial Consultant, East Longmeadow, Mass.

A. Cushioning and Shock Problems

a. "Practical Application of Theories of Cushioning", by James S. Hardigg, Hardigg Engineering Company, Washington, D. C.

b. "Shock Mounts of Various Types and Materials", by Jack Goodell, Development Engineer, Lord Manufacturing Company, Erie, Pa.

B. Quality Control—

a. "Standards and Specifications", by Earl B. Candell, General Electric Company, Lamp Department, Nela Park, Cleveland, Ohio.

b. "Material Quality Control", by Alfred W.

Hoffman, Quality Control Manager, Robert Gair Company, Inc. New York, N. Y.

c. "Completed Package Quality Control", by J. J. Kipnees, Container Laboratories, Inc. New York, N. Y.

### Section IIb

**Applied Material Handling Principles:** Gould Student Center Auditorium, East Campus; Chairman, John Mount.

**A. Material Handling "Imagining".**

a. "Radio Control of Material Handling Equipment" (control of yard and shop trucks), by R. H. Graves, U. S. Metals Refining Co. Carteret, N. J.

b. "Material Handling Imagining", by Richard J. Sweeney, Drake, Startzman, Sheahan, Barclay, Inc. New York, N. Y.

**B. Practical Problems of Material Handling.**

a. "Safety", by Prof. Walter Cutter, Professor of Safety Education, Center for Safety Education, New York University.

b. "Training", by A. J. P. Akrep, Supervisory Engineer, U. S. Naval Supply Depot, Research and Development Facility, Bayonne, N. J.

### Section III

**Management Day—Management Aspects of Packaging and Material Handling:** Gould Memorial Auditorium, West Campus; Chairman, Walter J. Byrd, Standard Brands, Inc., New York, N. Y.

Automation and Management, Contemporary Concepts. A panel discussion. Moderator—J. E. Wiltrakis, Ass't. Supt., Factory Engineering, Kearny Works, Western Electric Co., Kearny, N. J.

**B. "Research and Development and What it Means to Management"**, by Dr. R. H. Lueck, General Manager, Research and Technical Dept., American Can Co., New York, N. Y.

a. Proper Planning and Development of the project

b. Presentation to Management



Each 9-pound 34" x 48" Signode Addison-Semmes pallet safely carries a load of 2100 pounds . . . the bottom pallet, 6300 pounds — more than 3 tons!

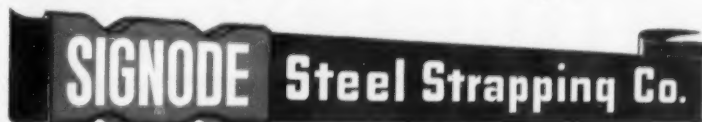
## Why should Signode run this ad?

For two good reasons. First, Signode engineers can now design economical pallet handling methods, using Signode Addison-Semmes expendable pallets—with or without steel strapping.

Second, we can make a point about Signode that is often overlooked—Signode sells *service*—better methods of packaging, reinforcing, protecting and handling shipments—from single packages to carloads.

Shown here is a case in point. It is far more economical for both shippers and receivers of bagged materials to use Signode Addison-Semmes expendable pallets. In this instance, gluing the load provides adequate security. Loss due to broken bags is eliminated. Manual handling is virtually ended. Loading and unloading time is reduced to the minimum. Use of warehouse pallets is eliminated. Better housekeeping and simpler inventory control are additional advantages.

Perhaps your shipments can be unitized for greater economy on Signode Addison-Semmes expendable pallets. Your Signode fieldman will be glad to tell you. Write



SIGNODE ADDISON-SEMMEs DEPARTMENT  
2618 N. Western Ave., Chicago 47, Ill.

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-wide  
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

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# New AUGER-MATIC Valve Bag Packer

**SHAKES . . . SETTLES . . . AS IT WEIGHS AND FILLS  
CUTS YOUR BAG SIZE AND COST**

AUGER-MATIC fills, shakes and weighs paper valve bags all in one operation. Just push the starter button and when desired weight is reached it shuts off automatically. Cuts cost of bags and packing costs on powdered, granular, pellet and fibrous materials . . . reduces dust to a minimum.



**NEW!**  
**Fill Valve Bags as Small as 10 Pounds**

**Your Present Auger-MATIC is now more versatile than ever**

New small size spouts and augers now available to fit production requirements on 10 to 25 pound bags. You can change in a matter of minutes from packing 100 pound bags to the 10 pound valve bags . . . cut cost by using minimum size bags for exact weight desired.

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information...  
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5080 NORTH 37TH STREET • MILWAUKEE 9, WISCONSIN

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**S. I. P. M. H. E. SHOW**

*Continued*

C. "Coordinating Packaging and Material Handling with Production, Sales and Distribution", by H. G. Podlesak, Vice President and Executive Engineer, Kraft Foods Co. Chicago, Ill.

**WEDNESDAY, SEPT. 21**

## Section I

**Engineering Principles Review:** Nichols Hall, South Campus, Chairman John B. Farrington.

A. "Chemistry of Packaging and Material Handling", by Dr. Henry J. Masson, Professor of Chemical Engineering and Assistant Dean, College of Engineering, New York University.

a. Dramatic presentation of the basic principles of chemistry as they relate to corrosion, acidity and other factors effecting Packaging and Material Handling. This will cover principles of oxidation, corrosion, compatibility of substances, electrolytic action and alkalinity.

B. "Principles of Industrial Engineering as Related to Packaging and Material Handling", by Professor David P. Porter, Professor of Industrial Engineering, College of Engineering, New York University.

a. Introduction to What the "Occasional" Industrial Engineer Should Know.

b. Space Analysis, Layouts and Work Flow.

c. Technique of Time and Motion Studies for Packaging and Material Handling Engineers.

d. Analysis and evaluation of Industrial engineering data, quality and production Controls.

## Section IV

**Applied Principles: The Package as a Selling Tool:** Gould Student Center Auditorium, East Campus; Chairman, Robert I. Goldberg, Industrial Designer, Robert I. Goldberg Associates, New York, N. Y.

This is a special project developed in cooperation with members



of the Package Designers Council, New York City. Its objective is to show the relationship between the physical and the aesthetic aspects of Packaging—the relationship between engineering, marketing, sales and visual design. The program provides a group of the nation's top package design authorities in a "case history" presentation, illustrated with color slides.

**A. Fundamentals—Morning Session.**

a. "The Package as a Selling Tool", by Frank Gianninoto, Frank Gianninoto & Associates, New York, N. Y.

b. "Packaging Visual Design Strategy for the Point-of-sale", by Robert I. Goldberg.

c. "The Dynamics of Color for Sales Appeal", by Egmont Arens, Egmont Arens, Industrial Designer, New York, N. Y.

**B. Principles—Afternoon Session.**

a. "Brand Names, Trade Marks and Package Identification Techniques", by Jim Nash, Jim Nash Studio, New York, N. Y.

b. "Coordinating the Package Development Program—Engineering, Marketing, Advertising, Sales and Visual Design", by Francis Blod, Ind. Designer, Design Associates, Ltd.

c. "Evaluation of Current Package Design". A Panel Discussion by members of the PDC. Panel Director—Robert L. Gruen, Industrial Designer; Members—Allen Berni, George Reiner, Karl Fink, Gerald Stahl.



"I told the boss I was so sick I couldn't stand up."

SEPTEMBER, 1955



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**SAMPLE KIT**



Discover how Thilco  
**Unitized Loading** methods  
reduce breakage of bagged, canned or bottled goods

Recommended for use  
in shipping  
such products as: —

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- Ale
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- Liquor
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- Macaroni
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Big reductions in costly damage to goods in transit are now accomplished by Unitized Loading with Thilco WRAP-DRI Retaining Papers. Papers developed by Thilmann and recommended by the American Association of Railroads keep unit loads intact and reduce shifting to the minimum. Loads are tighter, more stable and better withstand humpage. Any wet damage from broken bottles is localized in the car. Full information on money saving Unitized Loading is yours for the asking. The complete brochure of sample paper grades, instructions and diagrammatic illustrations will help you save costly claim adjustment expense and build goodwill for your organization. Write for copy today.

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**RULE 41 AMENDED TO ALLOW  
2-STRIP CENTER-SEAM SEALING**

**CUT COSTS UP TO  $\frac{2}{3}$  WITH**  
**Filament Reinforced Sealing Tapes**  
**And The FAMOUS**

**DERBY  
32-T**



The first important closure method change in 40 years! . . . now use 2 strips of tape for all shipments! The Derby 32-T especially designed to dispense all brands of tough filament reinforced tapes quickly, easily, accurately!



Write now, Dept. F for free booklet about 2 strips and the Derby 32-T

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COSTLY  
CHIPPING  
DAMAGE**

Block, brace, inter-leave and wrap with  
low cost, **SOF-RAP**  
flexible

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**SOF-RAP** safeguards your products from:  
SHOCK • CRUSHING • CHIPPING  
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AND BOUNCE

Write for this helpful booklet and samples. Test-try SOF-RAP today!



**Difficult PACKAGING Problems**  
handled with ease.  
Let us show you How/PHONE OR WRITE

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166

**IN NEW YORK CITY SEPT. 20-22  
AT THE KINGSBRIDGE ARMORY!**

**INDUSTRIAL  
PACKAGING  
&  
MATERIALS  
HANDLING  
Exposition**

**10th ANNUAL** **10th ANNUAL**

A "decade of progress" in packaging and materials handling. Equipment — materials — techniques.

Competition—National Championship awards for technological improvements in packaging and handling.

Short Course—Outstanding technical program offered in cooperation with New York University.

Society of Industrial Packaging and Materials Handling Engineers — 111 West Jackson — Chicago 4, Illinois.

Circle 142 on Reader Service Card for more information  
**FLOW (PACKAGING & SHIPPING SECTION)**

## "PACKAGING HANDLING" . . .

(Continued from page 158)

mechanical handling and palletizing of packages and the efficient utilization of all cubic space in order to reduce costs to the minimum. Maximum utilization of cube may preclude intended warehouse expansion or it may release some warehouse storage area, not previously available, for storage of additional items, seasonal stockpiles and bargains.

### Palletization

Palletization has grown rapidly since 1939 and it continues to become increasingly important throughout packaging material handling. It has affected, and will continue to affect the design and standardization of containers and packaging materials as the use and standardization of pallets broadens and extends in the handling of domestic and foreign shipments. Its effectiveness is attested to by the fact that palletization increases with increasing competition and with rising manufacturing costs.

### Packaging Material Handling Costs

What is packaging cost? How much should it be?

Because of rapid growth of packaging as a vital factor in distribution, answers to such questions vary within and between industries. Few companies agree on the allocation of percentages of costs of overhead, management, shipping and promotion which should be charged to packaging. Surveys of industries have been made on the basis of including only the costs of packaging material, packaging labor and packaging overhead, but the results are useful only as guideposts.

### Allocating Costs

Packaging material handling costs may be difficult to allocate, even though studies are confined to the manufacturing plant. This is because much of the material handling equipment is used for handling not only packaging materials, but also raw materials and

# Send Coupon for Sample



DISTENSION OF CORE  
INCREASES DIMENSIONAL  
STABILITY UNDER MOISTURE

## STRONG but LIGHT

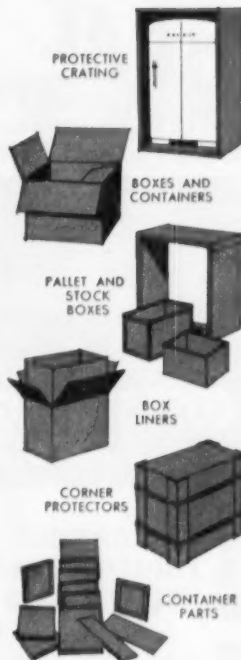
...an exceptional new  
packaging material

If you haven't investigated Ply-Veneer, by all means do so now! You may have a genuine opportunity for substantial savings on fabrication, handling and shipping costs.

Made of strong Douglas fir veneer core, bonded cross-grain to tough kraft on both sides, Ply-Veneer is an ideal combination of light weight and strength. It is characterized by stiffness and high resistance to impact, puncture or crushing. The core is mechanically distended to increase dimensional stability under conditions of moisture and humidity, as in cold storage.

Uniformly high in quality, Ply-Veneer is manufactured in seven different constructions...a type to meet almost any need.

Available in cut-to-size panel stock  
or factory-made containers



Special Products Division **WEYERHAEUSER TIMBER COMPANY** Tacoma 1, Washington, Dept. 104

**FREE  
Sample  
MAIL COUPON  
TODAY!**

VISIT BOOTH 207  
**SIPMHE**  
PACKAGING SHOW  
NEW YORK  
SEPT. 20-22

- ☐ Send P-V sample and container folder  
☐ Have field man call

Firm.....

Address.....

City and State.....

By.....

(This coupon may be pasted on postcard for easy mailing)

Circle No. 182 on Reader Service Card for more information



# THE SnakeTape IDEA...



\*For rail shipments  
under Rule 41 U.F.C.

use 2 strips only!

**CUTS LABOR 2/3** because you seal only the two center seams!

**IT'S STRONGER** because reinforced Snake Tape has strap-like strength. *Strength* you'll find in no other gummed tape because it's reinforced with rayon yarns... the same rayon yarns used in the best auto tires for superior shock absorbence.

**PROVE TO YOURSELF**, and at our expense, how much you can save in sealing time and in damage claims. Send for **FREE** sample of Angier Snake Tape now.

Free - 15 yd. sample



ANGIER CORPORATION  
Framingham 13, Mass.

Circle No. 17 on Reader Service Card

168

Circle No. 83 on Reader Service Card for more information

## IDEAL QUARTER

CUTS  
1/4 INCH  
CHARACTERS



Only...IDEAL ASSURES POSITIVE  
CHARACTER and LINE SPACING

### COMPACT

43 letters per running foot—10 lines per 4 inches. Over 200 characters in 4" by 6" area.

### PURPOSE

Stenciling small cartons, coding and marking products and for inspection purposes.

### REPLACES

labels, tags and stamping methods where marking and addressing on small containers is required.

### SPECIFICATIONS

Workmanship as in IDEAL larger models, the quality standard for 44 years. Cuts board and metal.

# IDEAL

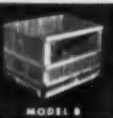
STENCIL MACHINE CO.

104 IOWA AVENUE

BELLEVEILLE, ILL.



For  
**LOW COST STORAGE**  
shipping and handling



USE...  
**COLLAPSIBLE  
TIGHT-CORNER  
PALLET BOXES**



ENGINEERED BY



- Economical
- Safe and Neat
- More Convenient
- Quickly Assembled
- Handles up to 5000 lbs.
- Collapsible When Not in Use
- Specially Made For Your Needs



30 Years Material Handling Experience



Circle No. 31 on Reader Service Card

## NOLAN ONE-MAN CAR DOOR OPENER



Opens Any Box Car  
Door in 20 Seconds  
or Less! **\$37.50**  
EACH

**FREE LITERATURE**  
F.O.B. NOLAN CO., BOWERSTON, OHIO

1st NOLAN COMPANY

110 Pennsylvania Street, Bowerston, Ohio

Please send ☐ ONE MAN CAR DOOR  
OPENER at \$37.50  
☐ FREE LITERATURE

NAME .....

ADDRESS .....

CITY .....ZONE.....STATE.....

Circle No. 132 on Reader Service Card

FLOW (PACKAGING & SHIPPING SECTION)



## "PACKAGING HANDLING"

*Continued*

products which do not fall in the scope of packaging material handling. It is possible to accomplish cost reductions through close scrutiny of all the segments of packaging material handling operations. For example, standardization of combined segments of unit-load packing and palletization may offer possibilities for substantial cost savings.

### Suggested Approach

A suggested approach to an overall study of the cost problem is, first, to make a combined manufacturing engineering and accounting analysis to evaluate the amount of money being spent on packaging material handling. The next step is to determine just what is being handled and how profitably. Such a study should determine the ratio of the sales dollar value of each packaged product to the total sales dollar value of all packaged products. Further study may then show where more material handling equipment or packaging machinery may be used to advantage. Or, it may show that it would be more economical to utilize the services of a contract packager for highly specialized and/or small-volume items.

### Transportation Costs

It is important to bear in mind that carrier rates on a product apply to the container too. Therefore, in selecting containers and packaging materials careful study should be given to container weight. Added container and packaging material weight does not automatically add protection during shipment. A relatively light, well engineered container may provide sufficient protection. Manufacturers are showing substantial savings through careful analysis of carrier costs and containers and packaging material costs.

*For photographs used in the preceding article, FLOW's thanks to Owens-Illinois Glass Co. and Rapids-Standard Co., Inc.*



**END THIS SAFARI...**



**Go Power Truck with  
Chestnut  
POKE-PAK**

**MEAD**  
board

Human carriers have small place in modern handling. Labor and time are too valuable. The efficient way to handle bag loads is to spot-glue them on Chestnut Poke-Pak—the ultimate in pallets. This rigid, light, tough fiberboard supports any weight your power truck can lift, carries as one unit to final destination. So inexpensive it's expendable. Better than wood pallets; eliminating credits, charge-backs, return freight, and torn bags. Omit floor lining, cover only car end walls. Store 60 to 70 Poke-Paks in space of one wood pallet. Economical, convenient for manufacturer, shipper, consignee, user!

**FREE CONSULTANT SERVICE** available from our nearest office; carloading diagrams, bag patterns, samples of Poke-Pak, made to fit any size bag unit, truck or car. Write for the complete story, including informative brochure.

**MEAD BOARD SALES, INC.**  
River Road, Lynchburg 2, Virginia

SALES OFFICES:

CINCINNATI 9, OHIO ..... 3347 Madison Road  
CHICAGO 30, ILLINOIS ..... 6124 N. Milwaukee Avenue  
NEWARK 2, NEW JERSEY ..... 10 Commerce Court  
DETROIT 35, MICHIGAN ..... 18045 James Couzens Highway  
BOSTON 10, MASSACHUSETTS ..... 43 Leam Street



**POKE-PAK COSTS SO LITTLE IT'S EXPENDABLE**

Circle No. 114 on Reader Service Card for more information

## TIME SAVERS

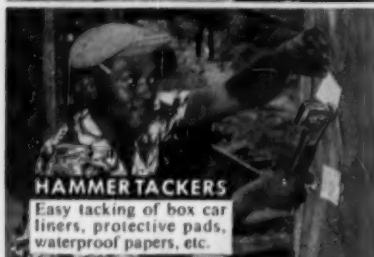
for  
**Shipping  
Depts.**

### DUO-FAST STAPLE TACKERS



#### AIR PLIERS

Speeds stapling of many types of corrugated cartons and fillers.



#### HAMMER TACKERS

Easy tacking of box cart liners, protective pads, waterproof papers, etc.



#### OC STAPLER

Staples tags to cartons. No anvil needed.



#### GUN TACKERS

For tagging wooden boxes, etc. Great all-purpose tacker.

These are a few of the jobs speeded and simplified by Duo-Fast equipment.

Mail coupon for details on fully guaranteed DUO-FAST STAPLER-TACKERS.

**MAIL COUPON**  
**FASTENER CORPORATION**  
860 Fletcher St., Chicago 14  
Please send data on Duo-Fast Tackers for Shipping Departments.

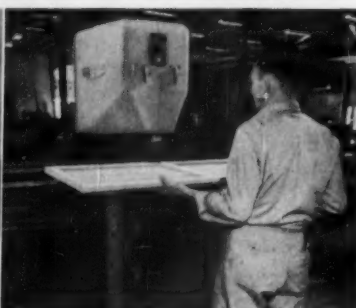
Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

Circle No. 64 on Reader Service Card  
170



*Says:*

**"AUTO-NAILER MAKES CLEATED BOXES  
MUCH FASTER THAN PREVIOUSLY POSSIBLE"**



As soon as Amendment No. 1 to Federal Specification PPP-B-601 was published, Temco of Dallas, one of America's leading aircraft companies started making all their cleated plywood shipping boxes on their Auto-Nailer. They make 24 different sizes—using panels from 12 x 12 to 24 x 48 inches, changing from one to another in seconds. Auto-Nailer makes, drives and clinches 3 nails per second, so turns work out much faster.

*Write for free catalog*

**AUTO-NAILER CO., 267 Marietta St., N.W., Atlanta, Ga.**



## CESCO'S TOTE-SHOP BOXES

DO YOUR ROUGH/TOUGH JOB  
EFFICIENTLY • EASILY • ECONOMICALLY  
on Conveyors • Pallets • Hand Trucks  
Skid Platforms or what have you



**STACK  
SECURELY,  
CONVENIENTLY!**

Solve your Storage and Handling Problems with our Tote Boxes, Trays and Pallets. Write today for quotations on special sizes. Special Marking Facilities, for identification purposes, are available in various colors and numbers. Please submit detailed specifications.



### Model # WB—Wood Bottom (illus.)

STANDARD SIZES AVAILABLE FROM STOCK

Model	Size	Length	Width	Depth	Weight
WB-1	I. D.	14 1/2"	11 1/2"	9"	11 1/2 lbs.
WB-2	I. D.	18"	11 1/2"	9"	13 lbs.
WB-3	I. D.	20"	11 1/2"	9"	14 lbs.

**CESCO CONTAINER CO.**  
Factory: NORTHAMPTON, MASS.  
General Office:  
Dept. (F) 475 Fifth Ave., New York 17, N.Y.

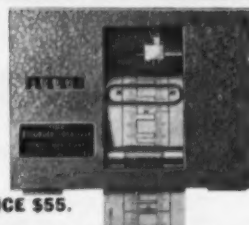
Circle No. 40 on Reader Service Card



**"COSTS CUT  
60¢ per hour  
per machine"**

"simplified our time study and cost analysis."  
"and, we will install your units on all our machines."  
"meets all our requirements. Ship 35 more units at once."  
—just a few of the many comments we receive daily about...

### TIME RECORDER-TOTALIZER



PRICE \$55.

• This precision instrument provides accurate, permanent, chronological data about any machine, process or system in plant or office... on a continuous chart-roll which lasts four months. Uses no ink. Totalizer shows accumulated "on" time. Descriptive literature PL on request.

### RECORDER DIVISION

HEAT-TIMER corporation  
657 BROADWAY, NEW YORK 12, N.Y.

Circle No. 78 on Reader Service Card

FLOW (PACKAGING & SHIPPING SECTION)

## PACKAGING ENGINEER . . .

(Continued from page 144)

to sell at one time, but in many cases, four is not.

Keeping in mind the merchandising aspects of the packaging problem, spaces for price were spotted so that when a four-lamp pack was intact, only a four-unit price was visible. When a two-lamp unit is removed from the larger pack, a two-unit price becomes visible.

Package shape was designed for easy handling by the buyer.

### Graphic Arts

In selecting packaging materials which will be printed or marked, the Packaging Engineer must show a knowledge of graphic arts. He must know what type of printing method is to be used and must select a container material on which the method is reproducible.

Another item of considerable importance is clear and effective product identification. This must be combined with the art and copy treatment of the package so that the particular product can be quickly and accurately recognized.

### Law

Legal Restrictions and requirements relating to trademarks, cautionary statements, etc. are of vital importance and must not be overlooked when a package is being designed. Prominent space must be provided for such information on every package shipped.

### Labor Relations

The packaging Engineer must not design packages which will run contrary to labor policies. For example, where female labor is employed, packages must weigh less than 25 pounds if they are to be handled manually.

### Management

Finally, the Packaging Engineer's function is, in a sense, a management one. He deals with a cross-section of responsible management, working for and with all other phases of management. He must be a conformist and a co-operator, although he must by all means be constantly on the alert and ready to suggest and push for new ideas and methods.



## EASIEST, MOST EFFICIENT METHOD EVER DEVISED FOR ADDRESSING SHIPMENTS

Imagine—no labels or tags to prepare and apply, no bulky stencil boards to cut, no expensive equipment to buy. It's so simple: A "label-frame" is preprinted on the cartons by the carton manufacturer. The ship-to address is imprinted on the cartons within the frames with

a small Weber handprinter and an inexpensive, paper stencil. Stencil is cut on a typewriter—separately or as by-product of your shipping paperwork. A clean, fast, systematic operation. Very inexpensive. (Handprinter costs just \$14.50.) Get all the details. Clip the coupon.

# Weber

Weber Marking Systems  
Division of Weber Addressing Machine Co.  
Mount Prospect, Illinois

#### MAIL THIS COUPON



for complete information on  
the Weber Direct-To-Container  
Addressing Systems

WEBER MARKING SYSTEMS  
Division of Weber Addressing Machine Co.  
Dept. 1-1  
Mount Prospect, Illinois

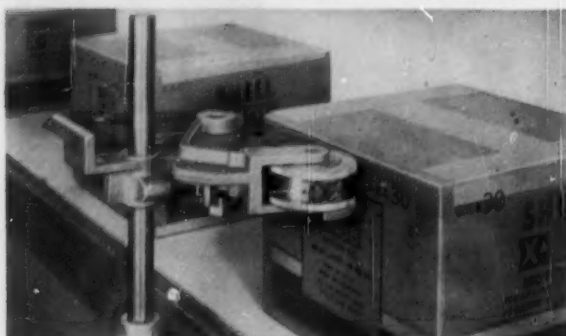
COMPANY \_\_\_\_\_  
INDIVIDUAL \_\_\_\_\_ POSITION \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

Circle No. 182 on Reader Service Card for more information



Circle No. 75 on Reader Service Card for more information

## Now...mark all 4 sides of cases automatically...in a single pass



### Twin-action Gottscho ROLACODER Markers attach to conveyor or case-sealer

New friction-driven marking attachments enable you to mark codes or lot numbers on 2 or 4 panels of corrugated cases as they are sealed or conveyed...without requiring cases to be turned. ROLACODER 500 marker imprints front and one side panel, ROLACODER 200 unit imprints rear and other side panel — mounted in tandem they mark all 4 sides simultaneously. ROLACODER markers use quick-change rubber type, hold 8-hour ink supply; are designed for easy do-it-yourself installation.

Write for descriptive literature

**Gottscho**

**ADOLPH GOTTSCHO, INC.**  
Dept. D, Hillside 5, N. J.

Automatic  
CODING, MARKING,  
IMPRINTING  
MACHINES

In Canada: RICHARDSON AGENCIES, LTD., Toronto & Montreal



Drawn with  
a FLO-MASTER

## Speed up Your Shipments with the Flo-master

When it comes to addressing boxes, crates, bags, cartons, etc., the Flo-master is an old smoothie. Interchangeable felt tips make lines varying in thickness from 1/8 in. to 1 in. Spring valve permits finger tip control of ink flow. Lightweight but sturdy aluminum construction. "Pocket Size" for general use — "King Size" for heavy-duty marking. Used with Flo-master Inks — instant-drying, water-proof, non-smudging.

Ask your supplier or write to Cushman & Denison Mfg. Co., Dept. F-22, 1953 W. 23rd St., N. Y., N. Y.

• A CADO Product



Cup of "King Size" may be screwed to bench to serve as stand.

# Flo-master

FELT-TIP MARKER

Circle No. 49 on Reader Service Card for more information  
172

## INDUSTRIAL LOGISTICS . . .

(Continued from page 152)

forced in cross as well as the longitudinal direction permits a single strip of sealing tape to effect the closure on regular slotted corrugated boxes. This, in turn, and particularly its acceptance by the railroads under Rule 41, clears the way for the automatic sealing of corrugated boxes.

### Americans Excel in Logistics

Industrial Logistics may seem to lack the glamour of nuclear physics or rocket engineering in the mind of the average person, but on reflection, it becomes apparent that it is in this field that American scientists have excelled perhaps more than in any other. Largely because of this excellence, we have been able to raise the standard of living to greater heights than other nations have even dreamed possible.

Today, as indicated previously, the tendency to employ engineers skilled in the techniques of packaging and material handling has grown to great proportions, and continues to grow. It is a recognition, on the part of the user, with the corresponding educational development of engineers properly trained in the field, that marks the point at which packaging engineering and material handling, or INDUSTRIAL LOGISTICS, can be properly considered to be a branch of engineering.



### Eliminate Shipping Labels!

## PRINT DIRECT

♦ Speeds Up Freight Marking ♦

Quick! Accurate! Easy! Print shipping information direct on cartons, boxes, packages. Eliminate double operation of preparing labels and then pasting them to the containers. Get 1,000 or more clear, sharp impressions from one stencil without re-inking. New FORM-CUT Stencil has facsimile of your label or shipping form die-impressed into the stencil. Then type or write in address or identification data... attach to duplicator... and print, like using a rubber stamp. Write for Literature and FREE SAMPLE FORM-CUT STENCIL AND PRINT.

THE ORIGINAL HAND STAMP  
STENCIL DUPLICATOR



OVER 30 YEARS

**MULTISTAMP**  
STENCIL DUPLICATOR

Also for addressing shipping tags and labels... prints, postcards, menus, forms, bulletins. 8 complete outfits: \$9.50 to \$99.50, including supplies (f.o.b. factory). At office or shipping room supply dealers.



Circle 126 on Reader Service Card for more information  
FLOW (PACKAGING & SHIPPING SECTION)



## S. I. P. M. H. E. EXHIBITORS . . .

(Continued from page 160)

Company	Booth Number
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National Metal Edge Box Co. . . . .	502
National Wooden Box Association . . . . .	602
National Wooden Pallet Mfrs. Assoc. . . . .	801
North American Equipment Corp. . . . .	302

Packmasters . . . . .	509
Polyken Products . . . . .	419
Powers Wire Products Co., Inc. . . . .	142
Preservation Packaging, Inc. . . . .	222
Herbert A. Post, Inc. . . . .	610
Pallet Sales Company . . . . .	317

Queen City Tulatex Corporation . . . . .	702
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Rathborne, Hair & Ridgeway Box Co. . . . .	505
Rentar Packaging Company, Inc. . . . .	214
Rheem Mfg. Co. . . . .	301-303

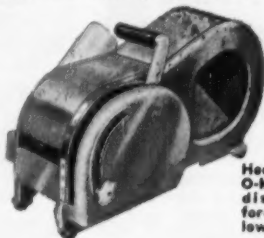
Seamless Rubber Co. . . . .	716
R. T. Sheehan Co. . . . .	200-202



### lowest priced quality tape machines

Featuring "advanced-styling" in a complete line of automatic and pull type tape dispensers, "lowest in price—highest in quality" . . . designed with the cooperation of Stewart-Warner engineers.

**SEAL-O-MATIC**  
**SENIOR 3"**  
**AUTOMATIC**  
**\$39.98**  
retail



Heavy duty Seal-O-Matic #55 for dispensing reinforced tape. At low, low price.

**\$49.98**

Finest made for heavy duty shipping. Tape widths 1½" to 3". Features a lifetime stainless steel blade, 2 pure bristle brush wetting. Visual measuring scale. Self adjusting moistening element. Automatically measures, wets, cuts, ejects tape lengths adjustable 2½" to 36"—each pull. Side bottle maintains water level in large tank. Full encased body.



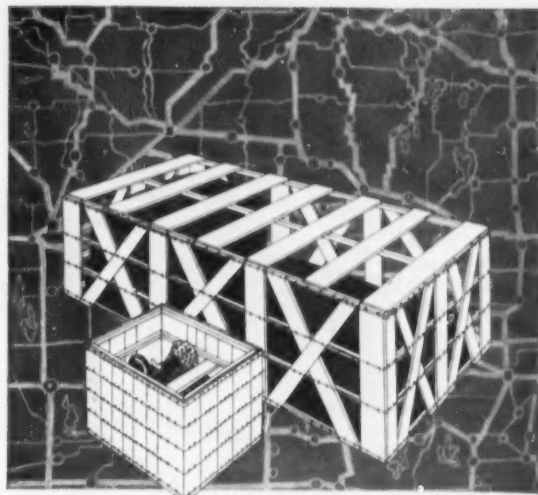
Send for either machine on 10-Day FREE TRIAL or write for price list.

**MANUFACTURING CO., Dept. F**

52 W. Houston Street • New York 12, New York

World's Largest Manufacturers of Low Price Quality Automatic Tape Dispensers

Circle 102 on Reader Service Card for more information  
SEPTEMBER, 1955



45 pounds or 2325 pounds

No matter where they're bound

**SHIP THEM WIREBOUND!**

Lower Total Cost

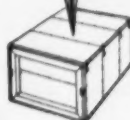
Better Stacking

Faster Assembly

Reduced Weight

Take a look at the boxes shown above and you'll get some idea of Wirebound's versatility. Pound for pound, Wirebound containers give your product the best possible protection.

That's because they're made of high tensile steel wire and resilient wood . . . a type of construction that guards against shock — protects while it carries. And Wirebound can carry *any* load, whether it's a 45 pound generator or a 2325 pound power saw. So, for a better, safer way to ship—look to Wirebound. Let a Wirebound Sales Engineer show you case histories that prove the point.



**Wirebound**  
**BOXES & CRATES**

**MAIL THIS COUPON NOW!**

**WIREBOUND BOX MANUFACTURERS' ASSOCIATION**

Room 1171, 327 South LaSalle Street, Chicago 4, Illinois

- ☐ Have a sales engineer give me the whole story  
☐ Send me a copy of "What to Expect from Wirebounds"

Name \_\_\_\_\_

Firm Name \_\_\_\_\_

Address \_\_\_\_\_

City, Zone and State \_\_\_\_\_

Circle 188 on Reader Service Card for more information

## Eliminate Printed Carton Inventory Costs!

**IMPRINT**  
your cartons  
as you need  
them with a  
**YOUNG**  
Carton Printer

No longer is it necessary for you to keep large stocks of printed cartons. Now you can imprint trademarks or special data either alone or in combination with company name, address, contents, size, etc.

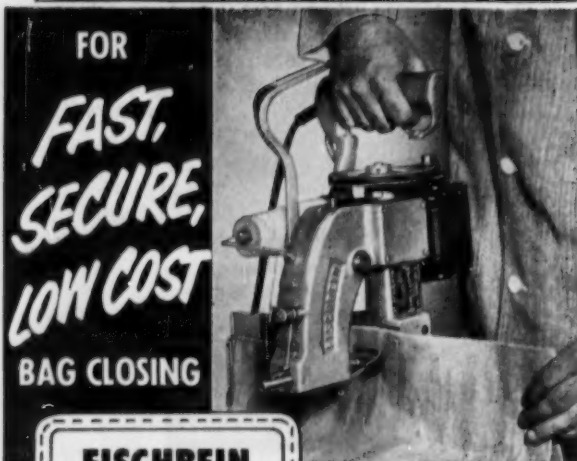
Cartons printed on a **YOUNG CARTON PRINTER** will set your cartons apart from competition in appearance and readability.

Contact your nearest D/B distributor for more details.

**DIAGRAPH-BRADLEY INDUSTRIES Inc.**  
P. O. BOX 269 HERRIN, ILLINOIS  
DISTRIBUTORS IN ALL PRINCIPAL CITIES



Imprinting special data on knocked-down cartons is quick, easy and positive.



**FOR**  
**FAST,**  
**SECURE,**  
**LOW COST**  
**BAG CLOSING**

**FISCHBEIN**  
*Portable*  
**BAG CLOSER**

- A truly portable bag closer ... Weighs only 10½ pounds.
- Requires no installation ... plug into any outlet.
- Handles textile and paper bags.
- Simple to operate and maintain.
- Lowest priced bag closer on the market.

**FOR DETAILS,  
MAIL THIS COUPON NOW  
DAVE FISCHBEIN CO.**

Dept. 48  
38 Glenwood Ave. N.  
Minneapolis, Minn.

Name.....

Firm Name.....

Address.....

City.....

State.....

Circle No. 203 on Reader Service Card for more information  
174

## S. I. P. M. H. E. EXHIBITORS

Continued

### Company Booth Number

Shipping Management .....806  
Signode Steel Strapping Co. ....500  
Skydyne, Inc. ....140  
Speedry Products, Inc. ....809  
Standard-Knapp .....413  
Stanley Works .....406  
Sten-C-Labl, Inc. ....712

Traffic World .....307

United Can Co., Inc. ....601  
United States Steel Corp. ....501-503  
United Mineral & Chemical Corp. ....711

Weber Addressing Machine Co. ....201  
Weyerhaeuser Timber Co. ....207  
Wirebound Box Mfrs. Assn. ....506-508  
Wood Conversion Co. ....306  
Wrap-ade Machine Co., Inc. ....209

Yale & Towne Mfg. Co. ....616

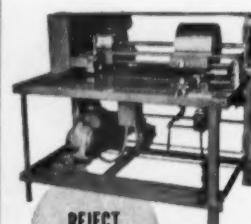
## START THIS MARKING PROFIT PARADE

.....use  
industrial's  
**NEW  
AUTOPRINTER!**

With the new, modern Autoprinter, you date, mark or code multiwall bags and containers as you need them! Completely automatic and electronically controlled, the Autoprinter works right with your production line ... at up to 3,000 impressions per hour!

Investigate how the Autoprinter can speed your operation, save container pre-printing and storage costs, and eliminate costly manual marking expense.

Write for details and catalog today. Dept. FL.



REJECT  
SAVINGS

INCREASED  
PRODUCTION  
SAVINGS

PRE-PRINT  
SAVINGS

INVENTORY  
SAVINGS

MAINTENANCE  
SAVINGS

LABOR  
SAVINGS

STORAGE  
SAVINGS



**ime**

**INDUSTRIAL MARKING EQUIPMENT**  
454 BALTIC STREET company, Inc.  
BROOKLYN 17, N.Y. MA(in 4-2601)

Circle 88 on Reader Service Card for more information  
FLOW (PACKAGING & SHIPPING SECTION)

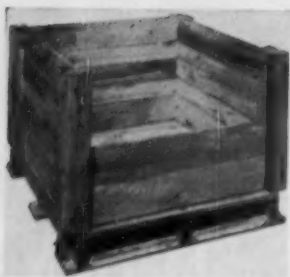
## flow's EQUIPMENT & SUPPLIES SECTION

To serve you better . . .

Here is a full section devoted to news about the latest designs and construction of all types of equipment and supplies—grouped together for easy reference by men responsible for material handling, packaging and shipping.

*To obtain complete information on any items which appear on the following pages, simply circle the appropriate numbers on the convenient, free-mailing Reader Service Card bound into this issue, pages 71 and 72, and send it to FLOW. Your inquiries will be answered immediately.*





#### BOX PALLET

Engineered for the handling and storage of bulky and odd-shaped items that cannot be handled conveniently on flat pallets is this Wilco box pallet. Constructed of all-oak lumber, units are shipped knocked-down complete with bolts and washers. Said to be economical, sturdy and long lasting.

*Williford Manufacturing Company*  
Circle 278 on Reader Service Card

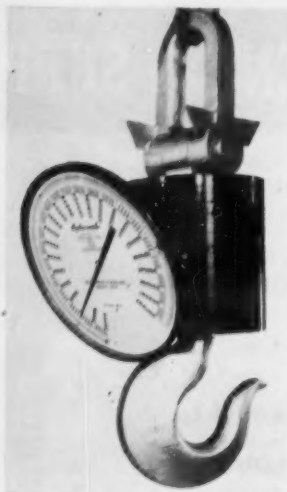


#### UNDER CAR CONVEYOR

Unloading of hopper bottom railway cars with extremely low discharge spouts need no longer be a problem.

Under Car conveyor pictured was especially designed for successful unloading. Can be manufactured in any desired length, and is said to be reasonably priced.

*Hack Engineering Co.*  
Circle 279 on Reader Service Card



#### HIGH TONNAGE SCALE

The heaviest capacity direct reading automatic crane scale ever built is the claim made for this unit. It has a capacity of 100 tons and is said to be particularly time-saving and practical in

weighing extremely heavy loads by crane suspension means. Ultimate load safety factor is 500 tons.

*Hydroway Scales, Inc.*  
Circle 280 on Reader Service Card



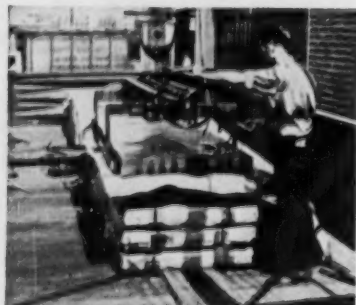
#### TRIPLE GREASE SEALED CASTERS

Newest caster from this manufacturer is triple grease sealed with Neoprene vulcanized retainers. Molded Neoprene grease seal is vulcanized to upper bearing raceway and snugly fits corrugated ring in top plate, keeping lubricant in. Thrust bearing grease retaining cup provides no-leakage protection; is easily removed for cleaning or inspection. Wheel bearing Neoprene ring is permanently attached to washer and press fitted into hub. Available with hard or cushion tread wheels in five-, six- or eight-inch sizes.

*Faultless Caster Corporation*  
Circle 281 on Reader Service Card

## MANSAYER GRABS

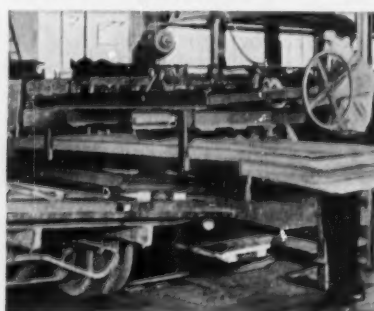
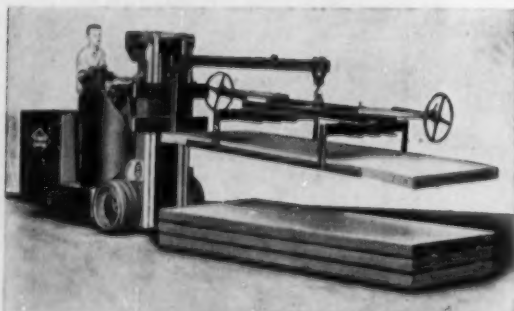
FASTER • EASIER • SAFER



One effortless turn of the handwheel on a Style 1142 Mansaver Unit Load Grab moves the legs 6 inches. And, regardless of the width of the load, the carrying angles are always horizontal—without adjustments. The results are obvious: faster production, greater safety, reduced operator fatigue.

Simply, the reason lies in the direct rack-and-pinion drive and parallel leg motion.

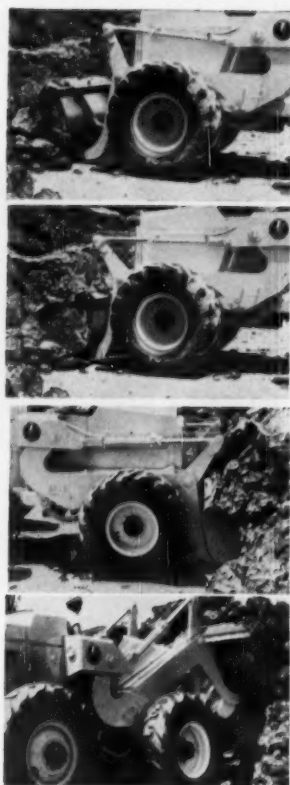
Put Mansaver's thirty-year engineering background to work for you. Write for complete information.



★ MANSAYER INDUSTRIES, INC. • 3103 EAST ST., NEW HAVEN, CONN. ★

Circle No. 110 on Reader Service Card for more information

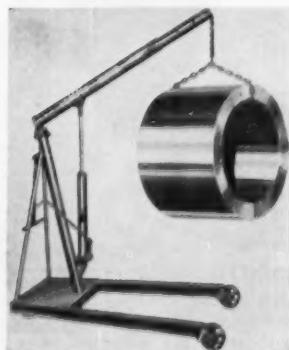




#### "PRY-OUT" ACTION PAYLOADER

"Pry-out" action is obtained on this Payloader by employing the simple principle of the lever. Breakout pads on the bottom of the bucket absorb pressure which otherwise would be transmitted to the wheels, axles and hydraulic system of the machine. In the sequence: (1) the bucket is flat on the ground; (2) breakout pads (on the ground) are used as a fulcrum to transfer load forces to the ground; (3) pads are still on the ground after pry-out and 40-degree breakout; and (4) load is raised.

The Frank G. Hough Co.  
Circle 282 on Reader Service Card

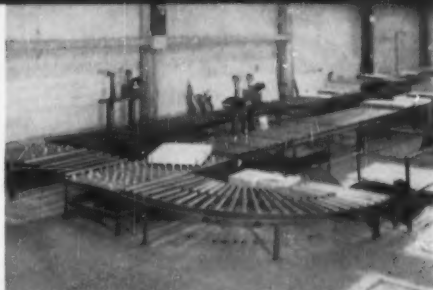


#### HYDRAULIC CRANE

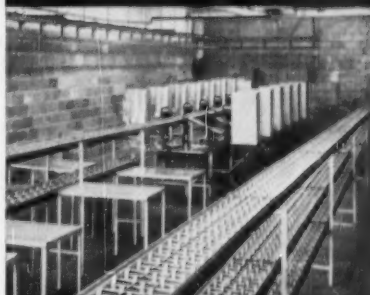
Hydraulic Mobilcrane is available in one-half, one- and two-ton models. Telescoping boom adds additional height

SEPTEMBER, 1955

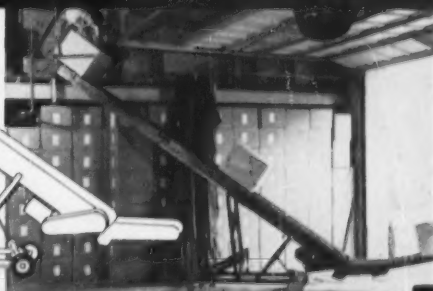
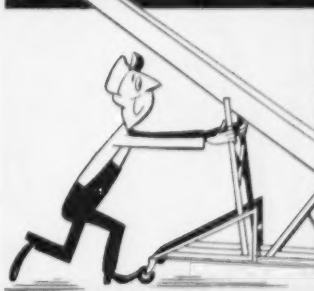
# CONVEYORS



## WHERE AND WHEN



## YOU NEED THEM



## BY BUSCHMAN

Exclusive design features make Buschman portable conveyors . . . wheel, roller and powered belt . . . quickest and easiest to move and put into operation. Durably constructed to withstand the roughest usage, these versatile conveyors have an unlimited range of application in production, warehousing, packing, shipping and receiving operations.

Pre-engineered standard components are combined into a conveyor

system custom-tailored to your particular job. Then, whenever requirements change . . . wherever a new need arises . . . your system can be rearranged or relocated in minimum time . . . at minimum expense.

Buschman portable conveyors are stocked at the factory and by leading distributors across the country. We'll gladly assist in surveying your plant to develop ideas which will cut costs, boost profits.

Write today for catalog and name of nearest representative.



THE E. W. BUSCHMAN COMPANY

4450 Clifton Avenue • Cincinnati 32, Ohio

CONVEYOR SYSTEMS FOR ALL INDUSTRIES  
ENGINEERED • MANUFACTURED • INSTALLED

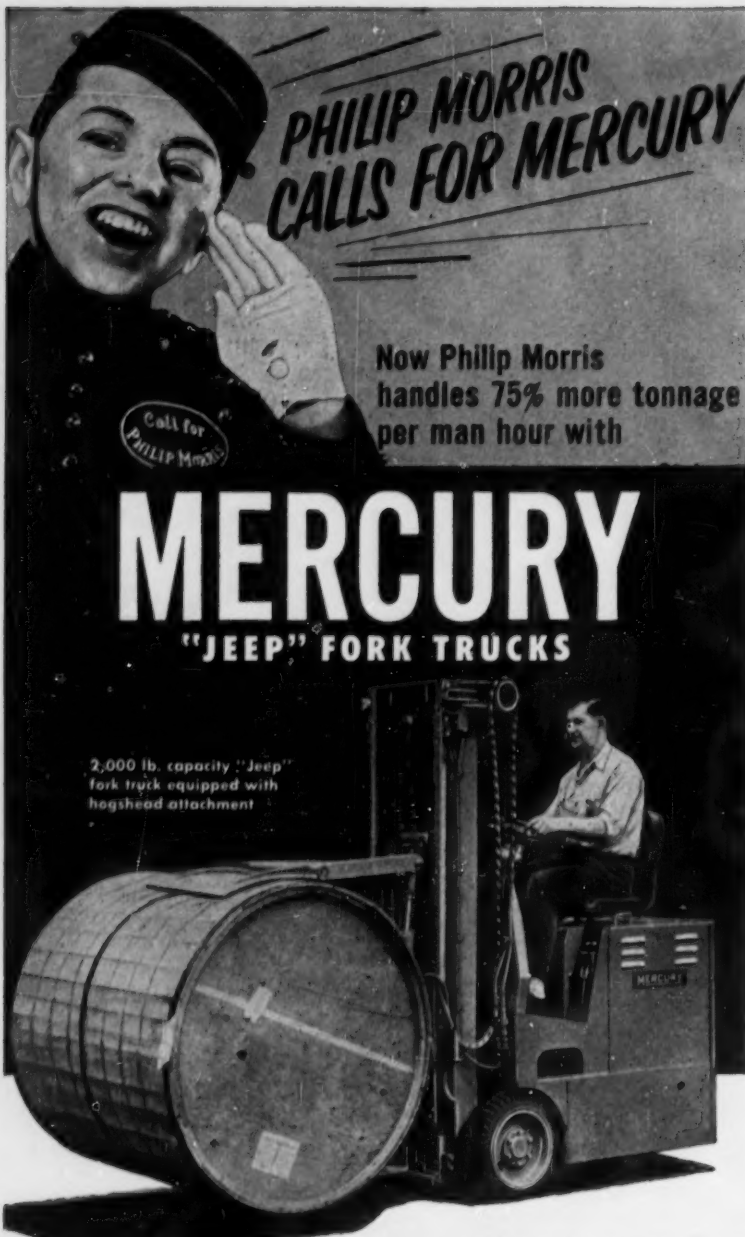
Circle No. 37 on Reader Service Card for more information

**PHILIP MORRIS  
CALLS FOR MERCURY**

Now Philip Morris  
handles 75% more tonnage  
per man hour with

**MERCURY**  
"JEEP" FORK TRUCKS

2,000 lb. capacity "Jeep"  
fork truck equipped with  
hogshead attachment



MERCURY "Jeep" Fork Trucks equipped with special hogshead attachments now handle four times as many tobacco hogsheads per man-hour than originally handled. This new method permits double tiering in freight cars . . . virtually eliminates damage to hogsheads.

MERCURY fork trucks (all types and capacities) are constantly solving difficult handling problems in all industries . . . effecting savings that amortize initial cost of equipment in record time.



Mercury Manufacturing Company, 4154 South Halsted Street, Chicago 9, Illinois  
Circle No. 115 on Reader Service Card for more information

MERCURY "Fork Truck — Trackless Train" Systems are recognized industry-wide as the most economical and effective method of moving and stacking material.

CALL FOR MERCURY (as Philip Morris and many other nationally known companies have) . . . our engineers will show you, too, how to save time and money in vertical stacking and horizontal handling.

Send me free literature illustrating and describing Mercury fork trucks.

Name \_\_\_\_\_

Title \_\_\_\_\_

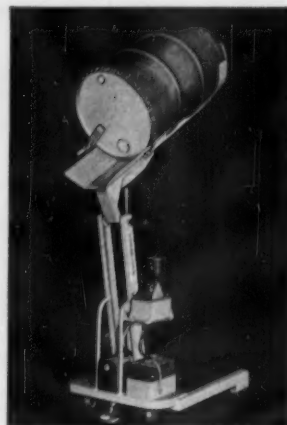
Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

and reach. Unit is 61 inches long, 32 inches wide, and turns completely in own length. Large casters permit easy movement of unit and load.

Lempco Industrial, Inc.

Circle 283 on Reader Service Card



#### PORTABLE DUMPER

Mobile hydraulic unit engineered to empty or transfer contents of one container into another. Called Tubar Dumper, accent of design is on speed, stability, efficiency and safety. Capacity 750 pounds with either manual or electric lift. Said to be low cost.

Uhrden, Inc.

Circle 284 on Reader Service Card

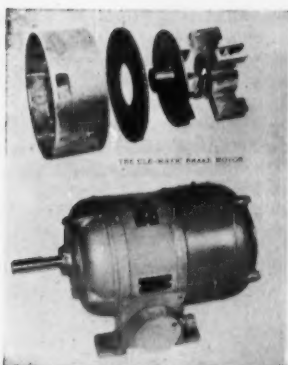


#### INDUSTRIAL MICROPHONE

Microphone designed for use with communication and automation systems for industry, unit is claimed to be particularly suited to all applications where level of ambient noise is a factor or where dust or moisture is prevalent.

Femco, Inc.

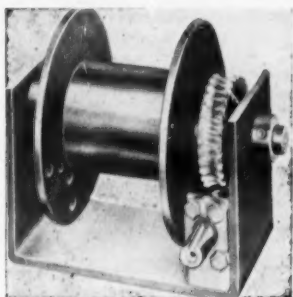
Circle 285 on Reader Service Card



#### NEW MECHANICAL MOTOR BRAKE

This new mechanical motor brake, built into the motor frame and enclosed in the housing, is 7 $\frac{3}{4}$  inches shorter than conventional models. Solenoids and coils are eliminated, as well as costly maintenance, says the manufacturer. The brake allows for quick opening and avoids sudden impact on stopping. Tension springs are adjustable.

*The Cleveland Electric Motor Co.*  
Circle 286 on Reader Service Card



#### SELF-LOCKING WORM GEAR WINCH

This new worm gear winch incorporates a self-locking feature said to insure safety in operation. There are no pawls or dogs to break, and there is no slippage when cranking, according to the manufacturer. Gear ratio is 29 to 1; capacity 2000 pounds; and operation may be either hand or power.

*Little Giant Products, Inc.*  
Circle 287 on Reader Service Card



#### DISPENSER FOR VPI

VPI chemical-coated papers which halt rust on ferrous metal and aluminum surfaces are now available in handy dispenser boxes. The boxes have

**CHRYSLER'S  
FORWARD LOOK  
IN MATERIALS HANDLING**

"Bantam" Model A-460 Gas Tractor pulling train load of Mercury A-310 trailers.

CHRYSLER STREAMLINES HANDLING WITH

## MERCURY "TRACKLESS TRAINS"

Chrysler Division's handling facilities call for mass movement of thousands of tons daily. Fast, dependable, economical hauling over long distances is a must in the Chrysler Jefferson plant, and the Mercury "Trackless Train" system provides the answer.

Flexibility is the number one advantage of "Trackless Train" operations. Loads are on wheels... readily movable by hand for short distances... motive power is free to perform other tasks.

Experienced material handling engineers from Mercury will be glad to furnish any data you desire. Consult the yellow pages of your phone directory. Write today for free literature on the Mercury "Trackless Train."



"Tug" Model A-550 Electric Tractor



A-310 Trailer, Burden Carrier of the "Trackless Train."



**MERCURY**  
FORK TRUCKS - TRACTORS - TRAILERS

**MERCURY MANUFACTURING COMPANY**  
4154 South Halsted Street, Chicago 9, Illinois

Circle No. 116 on Reader Service Card for more information



been introduced to afford greater protection for the paper and easier dispensing on the production line. VPI 310 and 320 Innerwrap flat is available in boxes in sizes 6" x 6", 9" x 9", 12" x 12" and 18" x 18", 1000 sheets per unit. When not in use the tear-down tab is replaced and the container is stored with adequate protection of the contents assured.

*Angier Corp.*

Circle 288 on Reader Service Card

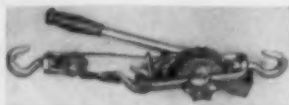
#### LIQUID PIPELINE TRAP

Removal of iron fines and tramp iron from liquid material is more effective with the Ferrotrap, claims the manufac-

turer. Two models of the magnetic unit are available to fit pipelines from 1/2- to 4-inches, plus a choice of materials, finishes and strengths.

*Eriez Manufacturing Co.*

Circle 289 on Reader Service Card



#### SMALL, POWERFUL PULLER

Capable of moving a freight car, yet weighing less than nine pounds, the Wright type R Pull-A-Way is said

ideally suited to a variety of hook-up applications. Made of lightweight Tenzaloy, the unit was designed with safety, economy and ease of operation in mind, according to the manufacturer.

*American Chain & Cable Co.*

Circle 290 on Reader Service Card



#### EASY TILE HANDLING

A full-circle rotating, hydraulic fork truck clamp for cement roof tile handling is available from this company. Tiles can be rotated through 360 degree circle at any point in vertical travel of forks to suit storage or loading requirements. Facings of both forks and clamps are fitted with durable rubber and plastic cover to insure tight grip and prevent damage to load.

*The Yale & Towne Manufacturing Co.*

Circle 291 on Reader Service Card

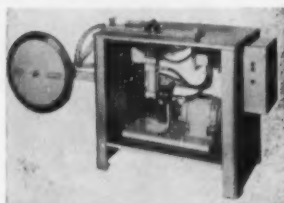


#### MANUAL ADJUSTMENTS ELIMINATED

Here's a motorized sheet lifter with arms that move in and out in a straight line, rather than in an arc. There's no need for manual adjustments when changing from one size sheet to another, since arms remain vertical at all times. All operations are controlled by crane-man. Self-locking brake and low headroom are featured.

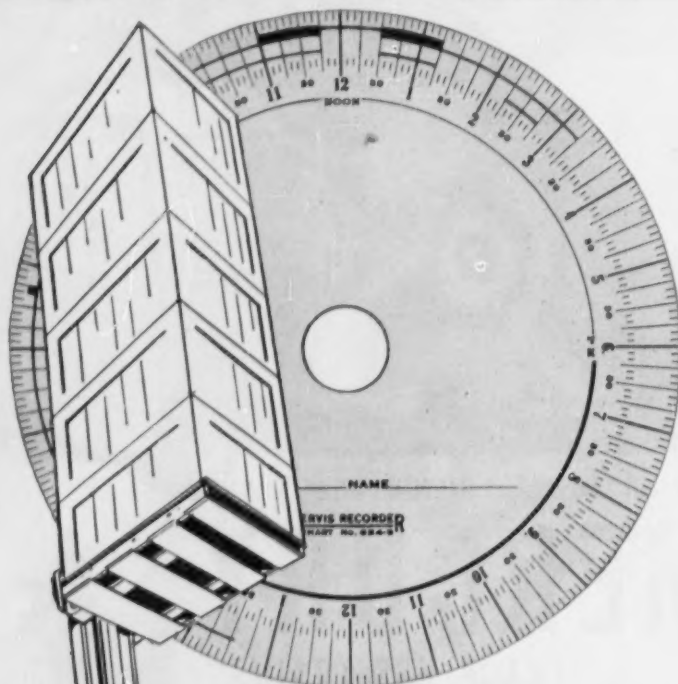
*Heppenstall Company*

Circle 292 on Reader Service Card



#### HIGH-SPEED BAND-SPLICER

Cottonband Splicer No. 2210 features a coil-fed, fully automatic sealing unit that will complete over 600 splices per hour. Manufacturer claims that the machine can be operated as fast as a crew can bale. Operator simply places banding material in the jaws of the machine, presses two switches simultaneously,



## OVERLOADING YOUR TRUCKS ISN'T THE ANSWER...



Equipped with Servis Recorders, your fork, high-lift, and platform trucks, conveyors, and other materials handling units, can be operated at peak efficiency—every working minute.

The Servis Recorder is an accurate instrument, easily installed, which records standing and moving time on a specially processed chart. Just bolt it on—no connection with any moving part. It will tell when your truck is BUSY... when it is IDLE... when it is LIFTING... when the engine is RUNNING. Also, when to OVERHAUL! For stationary equipment, Model M Electrical Servis Recorders chart productivity.

Write for information on Servis Recorders that help large manufacturing plants operate successfully. Ask for Bulletin I.T. The Servis Recorder Co., 1375D, Euclid Avenue, Cleveland 15, Ohio.

Tells Every Move Your Truck Makes

## The Servis Recorder



Circle No. 156 on Reader Service Card for more information



and the splice is completed. The next seal automatically feeds into the machine from a 2000-seal coil. Banding material removed from gin bales can be immediately spliced and applied to standard tables. The same is true of bands removed from standard bales and applied to hi-density bales.

*A. J. Gerrard & Co.*

Circle 293 on Reader Service Card



#### DISTINCTIVE POWER CRANE

Model 510 Unit Challenger is said to embrace distinctive design including quality construction, advanced engineering, expert workmanship. Features one-piece cast main machinery case, minimum of parts, conical swing rollers plus self-aligning hook shoes, force feed lubrication, hydraulic clutch controls, torque converter and safety cab with full range vision.

*Unit Crane and Shovel Corp.*

Circle 294 on Reader Service Card



#### PLASTIC TRAY

Tray made of fiberglass and polyester resins can also be used as nesting box for parts storage. Measures 17" x 23" x 8" and has additional reinforcements at ends.

*Molded Fiberglass Tray Company*

Circle 295 on Reader Service Card



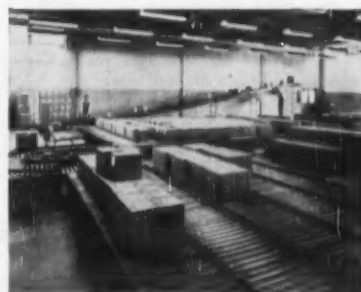
#### FLEXIBLE HANDLING SYSTEM

Low cost and flexible handling in any type of warehousing or storage operation can be yours with this lift truck system, claims the manufacturer. System consists of patented lift jack and engaging bracket and semi-live

# MATHEWS

## BUILDING THE BEST IN MATERIALS HANDLING EQUIPMENT FOR 50 YEARS

The Mathews line of package handling equipment is complete, including all types of gravity and power conveyers and special conveying machinery. Whatever the requirement—a few sections or a complete system—or whether the loads weigh 1 lb. or 30 tons, it is a job for Mathews engineers.



A complete package conveyor system, including gravity roller conveyers, live roller conveyers, and reversible belt conveyers—applied to maintain a continuous flow of material through production, storage, and shipping.



The Mathews line includes light (Chainveyor), medium, and heavy-duty overhead trolley conveyers. Transverse bends in this system bring small castings from ceiling to working level.



This system of roller and belt conveyers takes the hard work out of handling and inspecting passenger car and truck tires. The tubular-type supports shown provide easy, infinite adjustment of the conveyor lines.



Part of a warehouse bag handling system consisting of reversible, inclined and level, general purpose belt conveyers.



Mathews builds a complete line of standardized conveyers—including portable roller and wheel sections in either steel or aluminum, portable belt conveyers, ball transfers, lumber conveyers, stevedore dollies, and chain store check-out belts.



1905-1955

Engineering Offices or Sales Agencies in Principal American and Canadian Cities  
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GENERAL OFFICES . . . ELLWOOD CITY, PENNSYLVANIA  
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SAN CARLOS, CALIFORNIA  
CANADIAN DIVISION . . . MATHEWS CONVEYER COMPANY, LTD.  
PORT HOPE, ONTARIO

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platform skids. Quick starting and ease of operation are featured. Available in wide range of platform sizes and either metal, rubber or plastic wheels.

*The Hamilton Caster & Mfg. Co.*  
Circle 296 on Reader Service Card



#### FOR CAR SPOTTERS

New hydraulic lift dolly developed for quick lifting, transporting and lowering of Nolan Porta-Feeders and other

car spotters. Said to save considerable time during loading point changes. Has  $\frac{3}{4}$  inch roller chains equipped with hooks that attach to loops on bed plate of car spotter. Lifts by hand hydraulic pump.

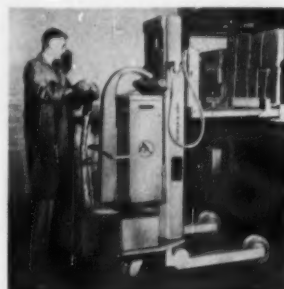
*The Nolan Company*  
Circle 297 on Reader Service Card

#### TRANSPORTS MASSES QUICKLY

A new concept in human transportation has been termed the Trav-O-Lator. Said to provide a fast, safe and comfortable method of moving large numbers of persons in congested areas, the manufacturer has adapted the principles of

the escalator to overland travel by means of an endless series of moving, metal-treaded platforms. Widths of 32- and 48-inches are available in any length, with gradients up to 14 degrees. Speeds of 180 fpm have been found to be practical and comfortable, according to the manufacturer, but actual speeds will be governed by customer requirements.

*Otis Elevator Company*  
Circle 298 on Reader Service Card

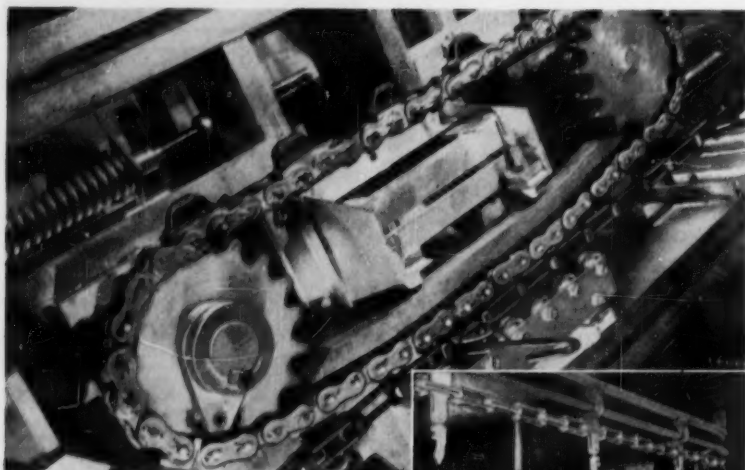


#### WALKIE TRUCK HAS EXTENDABLE FORKS

Loads as long as 48 inches and weighing 3000 pounds can be handled in 67 inch aisles with the HydraFork, new walkie electric tiering truck. Unit does not straddle load; rather forks are extended into pallet and then retracted into truck. Handles pallets of any width. Also available in 2000 pound capacity.

*Lewis-Shepard Products, Inc.*  
Circle 299 on Reader Service Card

## You can see the superiority of A-F Conveyor Engineering



### Take, for instance, the drive unit on an A-F Engineered Conveying System . . .

DO YOU know when a Sprocket type drive unit should be used on an overhead conveying system—or when should a Caterpillar Drive be included in the specifications?

Because of our longer experience in the industry—(A-F founded the package conveyor business in 1901)—you can be sure that A-F Engineers will give you the right answer.

So—take a look at any A-F Engineered plant-wide conveying system. You'll see not only automatic innovations such as mechanical scales and switches—for a single

case or an entire train of cases—electric eye counters and devices that automatically divide a single assembly line into two lines—then back into one line again—but conveying systems that are built to pace your plant at the most efficient speed . . . that are built to need less maintenance . . . less care . . . that are built to step up your production and make money for your company.

Before you order any type of conveyor write us. We'll be glad to submit an estimate. In many cases we will be low. But low—or not—you can be sure your A-F Engineered Conveyor System will be right!

### A-F ENGINEERED CONVEYING SYSTEMS

Also Pre-Engineered Conveyors—  
Wheel, Belt, Roller, Trolley  
Metal Cleaning and Processing Machines



Write For New Trolley Book,  
Without Obligation, Today!

THE ALVEY-FERGUSON CO., 437 Disney St., CINCINNATI 9, OHIO and Azusa, California

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#### SPRAY-ON STENCIL INK

Addition of a new color—aluminum—brings to eight the number of Stencil Inks available to packagers. Other colors are, black, white, red, blue, green, orange and yellow. It is claimed the inks may be used for the stenciling of cartons, crates, boxes, metal . . . in fact, almost any material. They are waterproof and weatherproof.

*Reynolds Ink, Inc.*  
Circle 300 on Reader Service Card

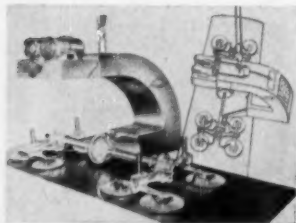
#### PORTABLE OR PERMANENT MOBILE RADIO

This 2-way industrial radio may be used as a base station or portable unit. Measuring 10 inches wide by 9 inches deep by 5 inches high, it can be mounted in any position and quickly transferred from vehicle to vehicle. Called the Model

J Pak-Fone, it operates from 6, 12 or 24 volt D. C. or 115 volt A. C. sources without a separate power supply.

Industrial Radio Corp.

Circle 301 on Reader Service Card



#### NEW SHEET LIFTER

This 8-cup vacuum roll-over sheet lifter has a capacity of 14,000 pounds. Equipped with a U-hook for attaching to an overhead crane, lifting is accomplished by vacuum produced by two pumps and conveyed by tubes through a storage tank to the cups. Sheets may be rotated 180 degrees, for easy inspection or vertical stacking.

F. J. Littell Machine Co.

Circle 302 on Reader Service Card



#### STEEL SHELF CART

New line of all-steel shelf carts designed to provide more efficient system for transporting variety of products. Feature two-way reversible steel shelves, 1 1/4" x 1 1/4" x 1/8" angle legs, ball bearing swivel casters, tubular pusher handle. Available in variety of types and sizes.

Bernard Franklin Co., Inc.

Circle 303 on Reader Service Card



#### SMALL SHOVEL-CRANE

Smallest unit in Lima line is this one-half cubic yard power shovel, 13- to 15-ton capacity crane, available with



WITH A

# LAMSON

## AUTOMATIC PALLET LOADER

The First Automatic Pallet Loader . . . And Proven In The Field

#### A LAMSON SAVES TIME

Lamson . . . the original Automatic Pallet Loader, can palletize up to forty cartons per minute . . . from one to seven different product lines. The Lamson Pallet Loader palletizes at the highest proven capacity with minimum product damage. Cartons fed from one or more accumulator lines are stacked in almost any pre-determined interlocking pattern.

#### A LAMSON SAVES MAINTENANCE

Simplified design, employing proven type electrical circuits, makes any maintenance easy with ready access to all motors and working parts.

#### A LAMSON SAVES SPACE

Lamson Automatic Pallet Loaders will fit into almost any convenient plant area . . . there are no floor holes or special supports needed. Side by side installation is possible because cartons can be received from six different directions . . . empty pallets can also be loaded into one of three sides.

#### A LAMSON SAVES PRODUCT DAMAGE

The Lamson Automatic Pallet Loader produces stacking patterns more stable and uniform than those produced manually, with the least product damage . . . there is no hydraulic oil to smear cartons.

**LAMSON AUTOMATIC PALLET LOADERS STACK 1,500,000 CARTONS EVERY 8-HOUR DAY IN:**

#### OIL



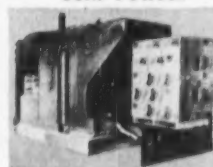
Esso Standard Oil Company  
Bayonne, N. J.  
1 of 13 loaders in the oil industry

#### BREWERY



Anheuser-Busch, Inc.  
St. Louis, Missouri  
1 of 56 loaders in brewing industry

#### SOAP POWDER



Lever Bros. Company  
Hammond, Ind.  
1 of 9 loaders in soap powder industry

#### AND THESE INDUSTRIES:

Soft Drink • Floor Tile • Sugar •  
Chocolate Syrup • Shortening •  
Insulated Wire and others

WRITE TODAY for the free booklet which shows how you can save thousands of dollars yearly with the Lamson Automatic Pallet Loader.



Plants in Syracuse  
and San Francisco  
Offices in Principal  
Cities

#### MAIL THIS COUPON TODAY!

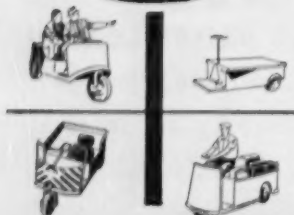
Lamson Corporation,  
2429 Lamson Street, Syracuse, New York  
Gentlemen: Please send me a free copy of your booklet on Lamson Automatic Pallet Loaders. This entails no obligation, of course.

NAME \_\_\_\_\_ TITLE \_\_\_\_\_  
COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

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**WRITE** for  
this new way  
to drive down  
handling costs



Here is the swift, silent way to lower materials handling costs, efficiently speed personnel from one task to another. All for as little as three cents a day! Westcoaster Electric Cars were designed with industry in mind. They're tougher by far than any other leading 1/4 to 1/2-ton capacity cars. Operation is safe and quiet as a cat, free from costly maintenance and repairs. Get all the time and money saving advantages of owning Westcoasters.



**WEST COAST MACHINERY, INC.**  
1801 E. Charter Way, Dept. E  
Stockton, California

Please rush your brochure on Westcoaster Electric Industrial Cars.

Firm \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_  
By \_\_\_\_\_

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184

Circle No. 48 on Reader Service Card for more information

## MOTORIZED COIL LIFTER

**SAVES  
STORAGE SPACE...  
HANDLES COILS FASTER... SAFER**

*1 Lifter Handles Both Wide  
and Narrow Coils With  
Same Speed and Economy*

This C-F Coil Lifter, under control of the Crane operator handles hundreds of coils a day in a large mill... wide, narrow, and of varying tonnage. Fast, infinite adjustments of the motorized legs permit quick pick-up and set-down. Legs can be opened to any width and held... no need to open to maximum width to handle narrow coil. Maximum of 12" required between coils of any width—saves storage room.

Positive tong grip on coil tightens as lift is made... insures safe handling. Made in motorized models for crane cab or pendant operation as well as manual types with chain wheel, in capacities from 3 tons up. Powered Rotating Heads available. Opening ranges to suit your requirements. Write for Bulletin and complete information.



## CULLEN-FRIESTEDT CO.

1320 South Kilbourn Avenue • Chicago 23, Illinois

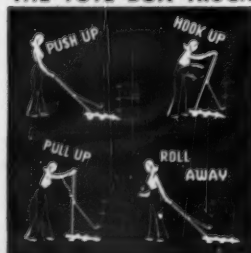
## WHEN *George* ROLLS 'EM HE MAKES HIS POINT

... the point being effortless pickup and rolling to destination of heavily laden tote boxes. "George," the almost-automatic truck, is backed up to the box and the hook is inserted into the box handle. Leverage developed by forward pull of truck handle glides the box over beveled edge of truck... onto upper set of rollers where it is held safely. Lower set of rollers carries truck away... so easily that women can do the job. No dangerous lifting, no strain. Order your "Georges" now... for safe, low-cost trucking.



*"George"*

THE TOTE BOX TRUCK



\*TRADEMARK

LET *George* DO IT

2RG55A

Write for free folder F  
**ROLOCK Inc. • Fairfield, Conn.**

Circle No. 150 on Reader Service Card for more information  
FLOW (EQUIPMENT & SUPPLIES SECTION)



crawler or wheel mountings. It is air controlled and has been designed for mobility, high output, speed and low cost maintenance.

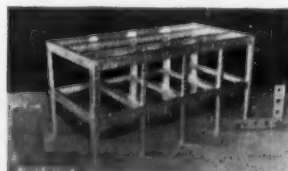
Baldwin-Lima-Hamilton Corporation  
Circle 304 on Reader Service Card



#### IN-PLANT BULK HANDLING

A 15 cubic foot capacity tractor shovel for in-plant handling of bulk materials. Designated Model 12B, unit features power-shift transmission torque converter with 3 to 1 torque multiplication, planetary wheel axle and low level bucket action. Designed to facilitate movement in and out of boxcars and along narrow aisles.

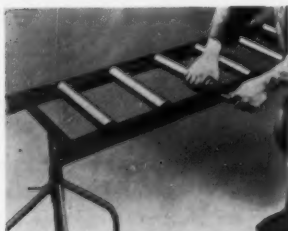
Clark Equipment Company  
Circle 305 on Reader Service Card



#### SCALED-DOWN ANGLES

A scaled-down version of their regular angle products has been introduced by this manufacturer, so that persons contemplating a Structo installation can work out a three-dimensional model. Full-sized angles, joined with standard 3/8-inch bolts, can be used for permanent or temporary storage racks, work benches, ramps, etc.

Structo System, Inc.  
Circle 306 on Reader Service Card



#### PRE-PUNCHED CONVEYOR FRAMES

Pre-punched conveyor frames that provide variable spacing of rollers to suit changing requirements is a new

# FACTS

## PROVE **HI-LO** DOCKBOARDS

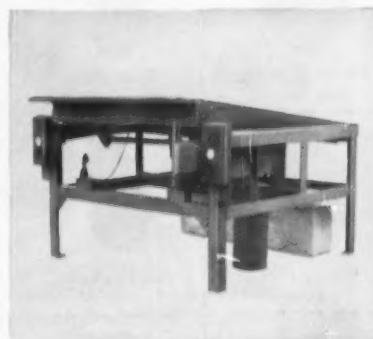
### YOUR BEST BUY—

*even if they  
cost you twice as much!*

- Fully Automatic
- New Safety for men, machines, products
- Low original cost, operating cost, maintenance cost

Now you can have fully automatic dockboards to speed dock handling, improve safety, eliminate damage to equipment and materials.

Hi-Lo Dockboards use a new lever-counterweight system utilizing the sure power of the backing truck for automatic operation. No dock attendant is required! Original cost, operating costs and maintenance costs are lower! Hi-Lo Dockboards do more for your dock than units costing over twice as much. The 8 features listed below show you why!



8 MAJOR FEATURES	HI-LO	DOCK-BOARD "A"	DOCK-BOARD "B"	LOOSE PLATES
1. Eliminates Dock Attendants	Yes	NO	NO	NO
2. Eliminates Specialized Maintenance	Yes	NO	NO	Yes
3. Standard model adjusts both vertically and horizontally	Yes	NO	NO	NO
4. Eliminates "man-handling"	Yes	Yes	NO (Hand operated pump)	NO
5. Has automatic cross-traffic lock	Yes	NO	NO	NO
6. Eliminates hydraulic pumps	Yes	NO	NO	Yes
7. Eliminates electric wiring and remote control stations	Yes	NO	NO	Yes
8. Truck supplies operating power	Yes	NO	NO	NO



For complete details, illustrations and specifications, write for Bulletin D-155-1 today!

## FULLY AUTOMATIC DOCKBOARDS

KELLEY COMPANY, Inc.

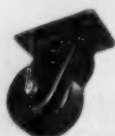
Formerly Dockboards Incorporated

316 E. Silver Spring Drive, Milwaukee 17, Wisconsin

Circle No. 92 on Reader Service Card for more information



# ALBION INDUSTRIAL CASTERS



Extra Heavy Duty  
Casters



Triple-Wheel  
Swivel Casters



"Thrifty"—Medium  
Duty Casters



Square Tube  
Top Casters



V-Groove Wheel  
Casters



Pipe Base Casters



Dual Wheel  
Casters



Giant Trailer  
Casters



Pneumatic Tire  
Casters



Heavy Duty  
Casters

Immediately available in a broad range of sizes, types and capacities to meet every conceivable industrial application.

Specify Albion, when you need rugged dependability, complete protection . . . plus amazing economies.

**ai ALBION  
INDUSTRIES Inc.**

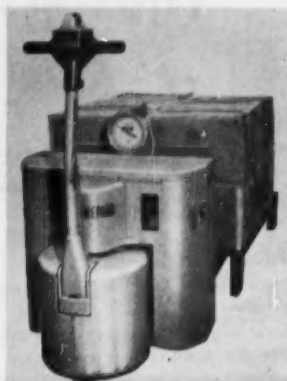
ALBION • MICHIGAN

Circle No. 4 on Reader Service Card  
186

feature of this company's complete line of gravity and power conveyors. Feature provides flexibility and economy by making it possible to reposition rollers to meet future changes in product or container shapes.

Sage Equipment Co., Inc.

Circle 307 on Reader Service Card



## REGISTERS WEIGHT ON WALKIE

Operator knows the weight of the load the instant it is picked up for transporting by this electric walkie truck. Load-scale can be used to give proper floor load distribution and to prevent elevator overloads.

Lewis-Shepard Products, Inc.

Circle 308 on Reader Service Card

Circle No. 38 on Reader Service Card

## CAPCO DOCK COVERS

GIVE  
YEAR 'ROUND PROTECTION

CAPCO Dock Covers completely enclose the space between car and building doorways protecting loading and unloading during bad weather preventing accidents insuring against loss of heat or refrigeration. 51 different models in any size for every loading problem.



Write for literature  
and name of nearest  
distributor.

**CAPCO**

622-24 PROSPECT AVENUE • KANSAS CITY 24, MISSOURI

## MOVE or STORE SMALL PARTS



## IN THE NEW FIBERGLASS TOTE BOX

- \* light but strong to carry greater payloads
- \* last indefinitely without maintenance
- \* tare weight is uniform . . . and they lock stack
- \* no sharp edges or corners; accident-free handling
- \* TOTELINE tote boxes are available in color for easy identification.

**TOTELINE**

Write for Bulletin 435  
**MOLDED FIBERGLASS TRAY CO.**

LINESVILLE • PENNSYLVANIA

World's largest producers of fiberglass reinforced resin trays and tote boxes

Circle No. 124 on Reader Service Card for more information

FLOW (EQUIPMENT & SUPPLIES SECTION)

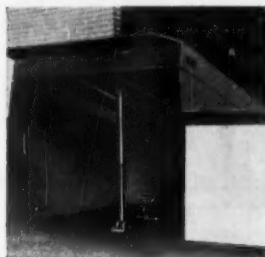


#### LIGHTWEIGHT CONTAINER

This all-metal, collapsible, four-way pallet and shipping box combination, called the Band-Box, is said to be lightweight, strong and durable. It consists of a compact combination steel pallet, container sides and top, fully nestable in its component parts. Cover insures cleanliness and protects contents. Will support static loads in excess of 10,000 pounds.

Ackermann Manufacturing Co.

Circle 309 on Reader Service Card



#### FLOATING RAMP HANDLES ANY TRUCK HEIGHT

Trans-O-Matic ramp with built-in automatic floating action. Will handle all loading and unloading regardless of truck-bed heights as ramp lip rides with fluctuating height of truck-bed as load weight changes. Can also be positioned at platform level to permit normal dock cross-over traffic and heavy storage loads. No excavation required; connects to A-C power line.

Globe Hoist Company

Circle 310 on Reader Service Card



#### SNAP-OPEN TAPE ROLLS

An easy-starting "snap-open" tab has been developed for rolled sealing tapes. The tab holds a roll securely closed, yet ready to be snapped open with a simple pull. In addition to speedier openings, tape waste in opening is reduced to less than three inches. Load-

# Now! A packaged conveyor!



## NEW

# R-W "460"

Continuous Power Chain Conveyor



requires no special installation engineering!

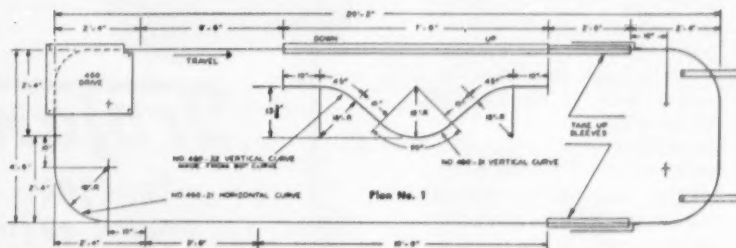
Richards-Wilcox' new "460" overhead conveyor can be installed without special engineering by your own plant personnel, quickly and easily, to meet your specific needs.

Completely packaged and shipped from stock, it offers economical and versatile light-load handling because of its lower load limits, flexibility, and easy installation.

R-W "460" is unequalled for jobs where the use of heavier conveyors

is impractical. It is particularly recommended as a supplementary unit on production lines, and to help simplify and speed production where drying ovens, washers, paint sprayers, de-greasers and similar operations are involved.

R-W "460" is available up to 200-ft. maximum lengths *only*, with capacities of 8½ lbs. on 6-inch centers or 17 lbs. per lineal foot, and 200 lbs. draw-bar pull.



"460" Conveyors are shipped completely packaged, in convenient, easily-handled units, from stock throughout the U. S. Packages to fill any requirement up to 200-foot maximum length are immediately available from stock. For complete information and descriptive catalog, contact:

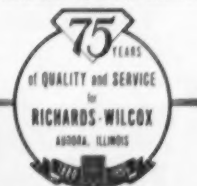
Diagram shows one of many different layouts possible with R-W "460" basic package. Up to maximum over-all length of 200 feet, variations are almost unlimited.

## Richards-Wilcox Mfg. Co.

MATERIALS HANDLING DIVISION  
Branches in Principal Cities

460 W. THIRD STREET, AURORA, ILL. SLIDING DOOR HANGERS & TRACK • FIRE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT • INDUSTRIAL CONVEYORS & CRANES • SCHOOL WARDROBES & PARTITIONS

Circle No. 149 on Reader Service Card for more information







Bakers depend on specially engineered Victor conveyor belting for sanitary handling that cannot mar the smooth surfaces of their product. Building supply men know that their specialized Victor belting is tough enough to stand up to the weight and roughness of brick. The answer to your conveyor problem is probably a Victor product, too.

Victor, you see, manufactures the most complete line of textile belting in America. The many Victor engineering belting styles include solid-woven, canvas-stitched, neoprene and balata types in an unmatched range of widths and thicknesses. Standard and special coatings and impregnations adapt untreated belts to hundreds of specialized uses.

One of the hundreds of possible combinations of weave, thickness and treatment may be just the belt you need for your conveyor system. It pays to check with Victor before buying any belting product.

Write today  
for full information.

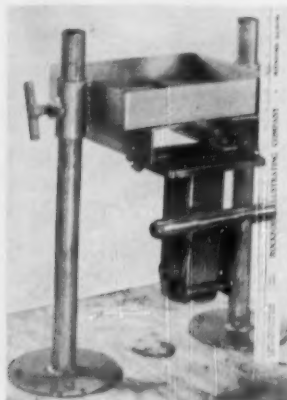


Circle No. 177 on Reader Service Card  
188

ing of dispensers is also said to be speeded up, because the tab opens a roll cleanly, without jagged edges.

Hudson Pulp & Paper Corp.

Circle 311 on Reader Service Card



#### AUTOMATIC TRUCK LOCK

Automatic truck locks in a standard range of sizes for mounting at any height required without need for build up pads or shims are available from this manufacturer. May be used with virtually any caster. Lock pictured is fully retracted, reflecting four inch ground underclearance at this particular mounting height.

Modern Caster Company

Circle 312 on Reader Service Card

Circle No. 119 on Reader Service Card

## MOVE MORE FOR LESS WITH MICRO LEVER-DOLLIES

Immediate Delivery

Made in Three  
Handy Sizes

Usually Purchased and  
Used in Pairs

Reasonable  
in Price and  
Guaranteed

Finest  
Materials  
and Work-  
manship.

After  
First  
Use You'll  
Wonder  
How You  
Ever Got  
Along With-  
out Them

Write for  
complete  
descriptive  
circular



MICRON, INC.,  
Dept. F  
BETTENDORF, IOWA



## Trojan TRACTOR for POWER TRAVEL

Proven Money Saver In Hundreds of Instances.  
Ask for Trojan Tractor Bulletin 810.

Make your hand pushed hoists and cranes power traveled. Eliminate slow pulling and pushing drudgery. Speed up handling, save time, increase production, reduce costs. Simply attach a Trojan Tractor; inexpensive, quick delivery. Order one today.

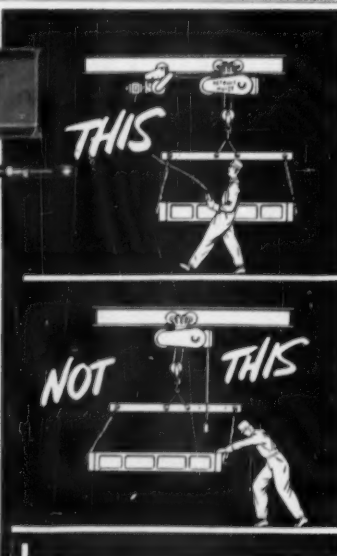
### DETROIT HOIST & MACHINE CO.

8210 Morrow St., Detroit 11, Mich.  
Hoist, Crane & Tractor Designers & Manufacturers

Since 1905

Circle No. 52 on Reader Service Card for more information

FLOW (EQUIPMENT & SUPPLIES SECTION)



\* Also ask for the  
Detroit Hoist & Machine Co.  
New General Catalog 795



Electric Traveling Cranes



Electric  
Hoists





#### MAGNETIC CONVEYOR SAVES SPACE

A magnetic conveyor that permits close grouping of machines to save floor space. Called Space Saver, unit conveys ferrous materials up inclines as steep as 90 degrees. Feed point can be at floor level or any desired height on conveyor. Can also stack flat pieces and perform other handling operations in automated production lines.

Homer Manufacturing Co., Inc.  
Circle 313 on Reader Service Card



#### APPLIANCE HANDLING ATTACHMENT

Ability to pick up two crated refrigerators and stack them with precision more than 20 feet high is the claim made for this pair of spring-applied clamps. Side-shifting mechanism moves the load four inches each way. Hydraulic pressure holds load.

Automatic Transportation Company  
Circle 314 on Reader Service Card



#### MAGNESIUM PALLET DOLLIES

Re-designed line of magnesium pallet dollies features extruded magnesium frames, hardened steel axles and phenolic resin rollers with factory-lubri-

# Radio Dispatching Saves Trucks at Socony-Vacuum

## RCA 2-Way Radio Makes Efficient "Automotive Pool" a Reality



(Above) Hydraulic lift raising pan to deck of loadlifter at Paulsboro, N.J. refinery of Socony-Vacuum Oil Company. (Left) Henry Cannavo, Assistant Foreman, Automotive, giving order via 2-way radio.

Pickup trucks, stake trucks, a fork lift, a jeep, a towmotor, winch truck and station wagon are radio-equipped for instant control by a dispatcher over a 33-mile radius at Socony-Vacuum Oil Company. These trucks are used for materials handling, maintenance, and labor transportation, one even going outside the plant to pick up materials. This has replaced the former method of assigning trucks to individual shops, causing idleness of some, at times, while others were overloaded. All are dispatched by RCA 2-Way Radio from a central control point.

"Two-way communication saves trucks," says Henry Cannavo, Assis-

tant Automotive Foreman. "Take the case of our loadluggers, used to clear away pans of scrap filled by crews of laborers at strategic points throughout the yard. It used to be necessary to tie up dump trucks at these points. By substituting movable pans toted by radio-dispatched loadluggers, we estimate that five such vehicles are equal to 20 trucks."

In hundreds of installations, RCA 2-Way Radio is saving trucks—and money, by adding to the productivity of materials handling and maintenance vehicles, and reducing needless paper work and manhours. Are you making use of this profitable tool in your operation?

**GET THE BEST—GET RCA 2-WAY RADIO . . .** The high quality offered by the leader in radio and electronics gives assurance of top performance—under the most gruelling conditions. Simplest maintenance and operating requirements. The RCA Service Company makes available installation and service to keep your equipment operating at its peak.

#### MAIL COUPON FOR MORE INFORMATION

Radio Corporation of America, Communications Equipment, Dept. W-131, Building 15-1, Camden, N.J.

- ☐ Please send new booklet, "How RCA Radio Control Cuts Cost of Materials Handling."  
☐ Please have representative call on me.

NAME \_\_\_\_\_ TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_



**RADIO CORPORATION of AMERICA**  
COMMUNICATIONS EQUIPMENT  
CAMDEN, N. J.

Circle No. 144 on Reader Service Card for more information

**MODERN FABRICATION  
RELIES ON EFFICIENT  
MATERIALS HANDLING**

# ALL-STATE Cranes CUT HANDLING COST

Surveys show that material handling costs average 30% of total production cost. An ALL-STATE overhead crane will provide astonishing savings in both labor and time, enabling you to reduce these major production costs to a minimum.

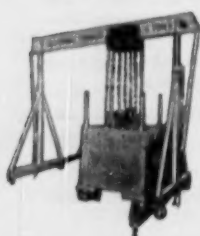


## JIB CRANES

For supporting, require no overhead support — ideal for outdoor crane service. Complete revolution possible for maximum coverage. Heavy Duty Ball Bearings. Capacities from 250 lbs. to 12,000 lbs.



Single Girder Type, Top Running Crane, Hand Geared, Motor Driven, Push Type. Available also in underslung or double girder style. Capacity 1 to 10 tons — up to 60 foot span.



## GANTRY CRANES

with adjustable girder height — telescoping outriggers — ball bearing swivel casters.

**FREE**

Complete information upon request.



Circle No. 7 on Reader Service Card 190

cated sealed bearings. Tilt construction, rounded-side rollers and heavy-duty roller bearings assure easy manual movement and 360 degree turning, according to the manufacturer.

Magnesium Company of America  
Circle 315 on Reader Service Card



## HANDLES DRUMS AUTOMATICALLY

A drum handling attachment for hand propelled fork trucks and portable stackers. Will handle any drum, open or closed, fibre or steel, regardless of diameter or height, in capacities up to 1000 pounds. Completely automatic and mechanical, pick-up and release effected through raising or lowering of truck carriage.

Marvel Industries, Inc.

Circle 316 on Reader Service Card

Circle No. 160 on Reader Service Card

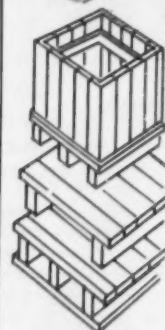
## Harvey Sez:

**They're Cheaper—  
But By Golly—we  
make 'em good and  
we can show ya!**

Dad bust my buttons if I ain't plum flabbergasted. I never seed the like of orders for quality boxes and pallets. We are shipping on schedule tho.

Up here in the hills, we mind our own business and turn out pallets, boxes and skids at a price that makes it downright embarrassing for competition.

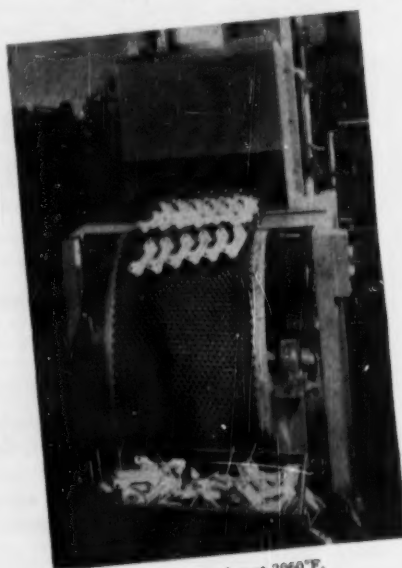
We have representatives in 86 cities but, if there isn't one to take care of you in your own home town, send us your requirements and we will take a crack at them. 5 mills in the East and 3 in the Midwest to serve you.



**SUPREME MFG. CO.**

P. O. Box 63  
BERGMAN, ARKANSAS

# Keep your product on the move...



Copper Bracing at 2060°F.

WITH

# ASHWORTH PROCESS BELTS

Woven from any metal capable of being drawn into wire form ASHWORTH belts afford a conveying medium in temperatures from sub zero to 2100°. Whatever your process—whether it be pickling, quenching, annealing, hardening or bluing—Ashworth belts can help you effect economies and

**Keep Your Product on the Move**

**ASHWORTH BROS., INC.**

WINCHESTER, VIRGINIA

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WRITE FOR  
ILLUSTRATED CATALOG  
F 55



Circle No. 19 on Reader Service Card for more information  
**FLOW (EQUIPMENT & SUPPLIES SECTION)**



#### TRUCK FEATURES BALANCED DESIGN

New FG-60 6000 pound gasoline fork truck features balanced design. Power unit, clutch, transmission and drive axle are chosen to match and balance with each other. Said to have extremely short turning radius, low initial and maintenance cost.

*Baker-Raulang Co.*

Circle 317 on Reader Service Card

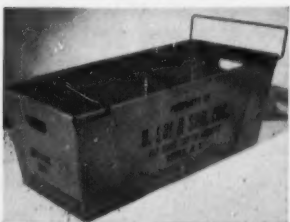


#### PORTABLE BELT CONVEYORS

New Versa-Veyor line features three types of powered belt conveyors constructed for production economy and greater flexibility of application. Series S12A pictured combines lightweight and low height, making it especially adaptable for use over stairways. With special undercarriage it speeds loading and unloading. Can also be used as power booster in gravity conveyor line.

*The Belt Corporation*

Circle 318 on Reader Service Card



#### SOLID FIBRE BANANA BOX

A re-usable fibreboard banana box, which reportedly costs one-third as much as the conventional wooden box and one-fifth as much as an aluminum box, has been designed and produced for the D. Loi & Sons Banana Co. The container is fabricated of .090 special solid fibreboard stock. A #6 gauge wire stitched within the top perimeter of the box provides rigidity. Two #2 gauge wire frames, which swivel from

STUEBING DESIGNED • STUEBING ENGINEERED • STUEBING BUILT

## Hydro~~Lectric~~ LIFT TRUCKS



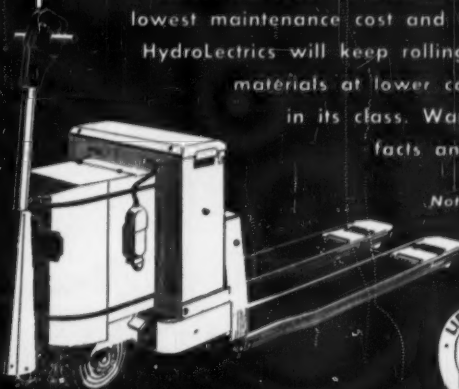
**EXCLUSIVE**

### HEART OF THE Hydro~~Lectric~~ THE DYNA-DUAL POWER UNIT

This sturdy Dyna-Dual Power Unit out performs all others for ease of operation—dependability—lowest maintenance cost and economy of power.

HydroLectrics will keep rolling and moving your materials at lower costs than any truck in its class. Want proof? Complete facts and data on request.

*Note: The Dyna-Dual Power Unit is interchangeable on all models.*



**LIFT TRUCKS**  
INCORPORATED

2423-31 SPRING GROVE AVE.  
CINCINNATI 14, OHIO

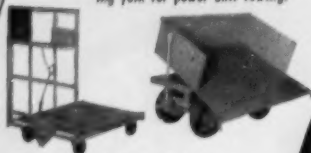


There is a model for every purpose to handle any kind of material

Circle No. 103 on Reader Service Card for more information



No. 852 STEEL SIDE-DUMPING HOPPER TRUCK. Side gate hinged on bottom extends to dump load away from running gear. Wheels remain on ground when body is tipped. Body is 36" wide, 60" long, 18" deep. Fifth-wheel steer and turning yolk for power unit towing.



No. 833 TOWVEYOR TRUCK. Reduces dispatching and sorting time in motor terminals and warehouses. Rigid all steel, all-welded frame with hardwood platform. Plastic or rubber tired wheels. Grease seals available. Clip board for instruction sheets, messages. Box for trip or inventory cards.



No. 855 FIFTH-WHEEL STEER TRAILER TRUCK. Rigid all-steel, all-welded frame with hardwood platform. 48" wide x 96" long. Equipped with dual 16" wheels, 4.00 x 8 six ply heavy duty pneumatic tires.

# **TOWSLEY**

## **TASK TAILORED GENERAL and SPECIAL FLOOR TRUCKS**

The trucks you see can be adapted to many uses. We have many more economical general purpose trucks to choose from and top flight engineers to develop new ones for your special job. If you have a unique handling condition that requires special planning, write or phone Towsley first.

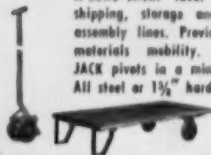


No. 509 MANY PURPOSE SHELF TRUCK. All-welded, steel construction. Pipe push handles at both ends. Furnished with 3, 4, or 5 shelves. 12" or 15" space between shelves.

No. 200 GENERAL PURPOSE PLATFORM TRUCK. All-welded, steel construction. Platform available in steel or 1" hardwood stock. Level type wheel mounting. Accommodates a variety of end racks at each end.



No. 900 SEMI-LIVE SKID with KUM-A-LONG JACK. Ideal for receiving, shipping, storage and progressive assembly lines. Provides maximum materials mobility. KUM-A-LONG JACK pivots in a minimum radius. All steel or 1 1/2" hardwood deck.



**TOWSLEY TRUCKS, INC.**  
1770 ELMORE ST.  
CINCINNATI 22, OHIO

Circle No. 173 on Reader Service Card  
192

the ends of the box and rest in notches die-cut into the tops of the side panels, make possible stacking when the boxes are filled. Special weatherproof fibre-board eliminates the need for protecting the box from rain or damp floors.

Robert Gair Co., Inc.

Circle 319 on Reader Service Card



### **IMPROVED DRAGLINE CART**

New dragline cart features many improvements. A rubber shock absorber in the dragline pin guide and a replaceable center portion of the deck constructed of kiln dried hardwood are pointed out. Also, tubular end rack with blackboard, chalk tray, bill holder and push bar, is removable to reduce shipping costs. Available in any width or length.

Lewis-Shepard Products, Inc.

Circle 320 on Reader Service Card

Circle No. 179 on Reader Service Card

## **Safe DRUM Handling**



Easy to install on any standard lift truck.

**LIFTS  
TRANSPORTS  
STACKS**



### **TRAY-HART. DRUM CARRIER**

- ▶ Alignment compensator automatically places drums into gripping position.
- ▶ Carrier loads over drums.
- ▶ Gravity action causes gripping shoes to securely hold load.
- ▶ Release can only be effected by application of hydraulic pressure.
- ▶ Standard models handle standard 55-gallon drums in diameters from 22 1/4" to 24 3/4", and permit 6" variation in height in same load.
- ▶ Special types available for Monorail, Crane, and other applications.



### **TRAY-HART. CYLINDER CARRIERS**

- All sizes and types of cylinders handled with ease.
- Quantity according to lift truck capacity.
- Write for complete information

Manufactured by

**WALZ & KRENZER, Inc.**

22 Flint Street, Rochester 8, N. Y.

# **UNITABLE<sup>®</sup>**

## **BELT CONVEYOR**

**For Assembly - Inspection - Packaging**

The most ADAPTABLE portable conveyor you can find. Exclusive "unitized" design 10' to 80' lengths. Write for UNITABLE Bulletin now.



**CONVEYOR  
SPECIALTY  
COMPANY INC.**

36 Newport Avenue  
North Quincy 71, Mass.

Circle No. 45 on Reader Service Card for more information  
**FLOW (EQUIPMENT & SUPPLIES SECTION)**

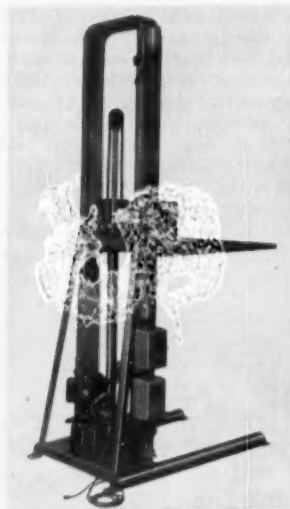




#### FOUR-POSITION SWIVEL LOCKS ON STEEL SWIVEL CASTER

Four-position swivel locks in four-, five-, six- and eight-inch sizes are available on Lockweld 23 series steel swivel casters. The four locking positions, 90 degrees apart, facilitate the orientation and locking of caster in desired position.

*The Fairbanks Company*  
Circle 321 on Reader Service Card



#### STATIONARY ELECTRIC ELEVATOR

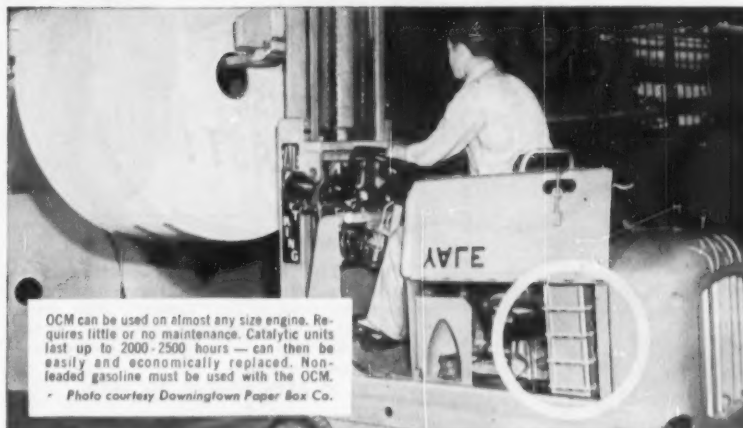
A 1000 pound capacity stationary electric elevator equipped with up and down push button stations and limit switches top and bottom. Available in various lifting heights up to 168 inches; platform size 32 inches wide by 36 inches long;  $\frac{3}{4}$  hp single phase motor.

*Lee Engineering Company*  
Circle 322 on Reader Service Card



#### HIGH CAPACITY BATTERIES

Two new lines of higher capacity industrial truck batteries have been introduced by this manufacturer. Called



OCM can be used on almost any size engine. Requires little or no maintenance. Catalytic units last up to 2000-2500 hours — can then be easily and economically replaced. Non-leaded gasoline must be used with the OCM.

Photo courtesy Downingtown Paper Box Co.

## KILLS DANGEROUS CARBON MONOXIDE FROM GASOLINE AND LP-POWERED EQUIPMENT —Also Eliminates Hydrocarbons— OCM CATALYTIC EXHAUST

Now you can operate lift trucks, bulk handling trucks, stationary engines — any type of gasoline- or LP gas-powered equipment — efficiently, safely, in even closely confined areas. For the OCM Catalytic Exhaust eliminates 95% or more of the deadly carbon monoxide, and 90% of the hydrocarbons, from the exhaust gases.

The OCM Catalytic Exhaust is made to replace standard engine mufflers. It's now available as optional factory-installed equipment from leading manufacturers, such as Buda, Clark, Yale & Towne, and Lincoln-Schlueter. Or it can be easily installed on present equipment by your own mechanics.

Wherever you operate gasoline- or LP gas-powered engines indoors — even part time — the OCM Catalytic Exhaust means an end to fume-caused headaches, eye irritation, and nausea. It means more efficient use of equipment, plus greater employee productivity and morale. Write now for complete information and the name of your nearest supplier.

## OXY-CATALYST, INC.

WAYNE, PA., U.S.A.

MANUFACTURING • ENGINEERING • RESEARCH

Fume elimination processes and equipment for internal combustion engines — for incinerators — for consumer products — and for industrial air pollution control and heat recovery.



FOR FORK TRUCKS



STATIONARY ENGINES



POWER SWEEPERS

**For Diesel Exhaust Fumes**  
New OCM Dieseler reduces below objectionable levels harmful, irritating exhausts from any 4-cycle diesel engine when running at or over 60% load. Write for details.



OXY-CATALYST, INC., Wayne 1, Pa.

Please send complete information on

- ☐ OCM Exhaust for gasoline engines
- ☐ OCM Dieseler for 4-cycle diesel engines
- ☐ Send name of nearest supplier

Name .....

Firm .....

Street .....

City ..... Zone ..... State .....

Circle No. 136 on Reader Service Card for more information



Inquirers in the U.S.A. or its territories, or in Canada, should write to Wayne, Pa. Inquirers elsewhere should write to Pan American Chemical Inc., 9 Rue Le Perouse, Paris 16, France.

Circle No. 166 on Reader Service Card for more information

**STERLINGS are my  
FIRST Choice because  
they LAST!**



(Above) Model D31/2S Maximum Capacity 3 1/2 cu. ft. 16 gauge tray, all welded, no rivets, double lapped at corners. Steel channel legs. V-shaped front braces and brace support.

For STAMINA, long-lasting ruggedness, you can't beat Sterling Wheelbarrows. Users say they seem to last "forever". Work them hard, overtime, in toughest service . . . you'll agree Sterlings survive hard punishment . . . again proving . . .

**IT PAYS TO BUY THE BEST.**



(Right) Model C5W Maximum Capacity 5 cu. ft. 16 gauge tray, all welded, no rivets, double lapped at corners. Heavy-duty malleable wheel guard.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

**Sterling**  
WHEELBARROWS



Look for this Mark of  
STERLING Quality

A 5878-16-R

the 66 and 125, construction consists of five separate layers of insulation, said to virtually eliminate need for sediment space. Longer and thicker plates fill space and provide 10 percent more capacity in standard size trays.

C & D Batteries, Inc.

Circle 323 on Reader Service Card



#### TINY CUSTOM-MADE BAGS

Custom-made plastic bags with moisture-proof, vapor-proof, acid-proof characteristics are available in sizes smaller than one inch in width and depth. They may be made of materials especially formulated to combat specific conditions which might be injurious to instruments or small parts. Inexpensive heat sealing equipment can be used to provide air tight closure. If the packages are to be merchandised, standard methods can be used for printing identification and sales messages.

Plastic Packaging Co.

Circle 324 on Reader Service Card

### You can provide easy mobility to a variety of industrial products with **IRONBOUND ALL-PURPOSE HANDLING UNITS . . .**



#### POPULAR IRONBOUND



• An easy to handle ruggedly constructed unit for carrying bulky and heavy loads at lowest cost. Seven standard sizes with one or two push handles makes it easy to select the proper truck for your requirements. Ask an Ironbound engineer for suggestions.



**The HANDY**  
for furniture and similar items.



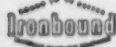
**The HAULER**  
for cases, crates, tote boxes, etc.



**The HUSKY**  
for general use throughout the plant.

#### THE IRONBOUND "SAFETY-SKID" WITH ROUND CORNERS

Ironbound construction assures long hard use with complete safety to product and operator. Still the time proven method for handling of materials efficiently and economically.



**IRONBOUND**

BOX & LUMBER COMPANY

Materials Handling Division

30 HOFFMAN PLACE • HILLSIDE, N. J.

MANUFACTURERS OF QUALITY BUILT SKIDS, SEMI-LIVE SKIDS, FLOOR TRUCKS, ROLL TRUCKS, DOLLIES AND PLY BARS

Circle No. 86 on Reader Service Card for more information

194

### METZGAR CONVEYOR SPECIALTIES



**FLEX-A-SWITCH  
2 OR 3 WAY**



**BUTT SPURS  
CURVED OR STRAIGHT**



**PRESS  
CONVEYORS  
MANY STYLES**



**FLEX-A-TAIL**



**NON-SHEARING  
SAFETY GATE**



**BANDING HELPERS**

and a  
full line  
of  
standard  
GRAVITY  
•  
POWER BELT  
•  
LIVE ROLLER  
and  
FLOOR TO FLOOR  
CONVEYORS  
• • •  
ASK FOR DETAILS

**METZGAR CONVEYOR CO.**

423 Douglas St., N. W.

GRAND RAPIDS, 4, MICHIGAN

Circle 118 on Reader Service Card for more information

FLOW (EQUIPMENT & SUPPLIES SECTION)



#### STURDY ELECTRIC TRUCK

New 3000 pound capacity electric fork truck designated Model F-45T3 and engineered for maximum sturdiness. Said to be ideal for use in narrow aisles and confined areas. Center control, sit-down type, 35 inches wide, 109 inches long overall with 36 inch forks.

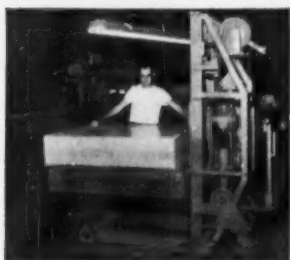
*The Elwell-Parker Electric Company*  
Circle 325 on Reader Service Card



#### SINGLE STROKE LIFT TRUCK

Capacity of the Model R single stroke handlift truck has been increased from 3500- to 4000-pounds. Truck will fit any type or make of skid and is built for speed and safe operation.

*Barrett-Cravens Company*  
Circle 326 on Reader Service Card

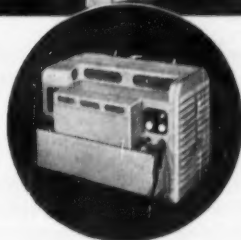
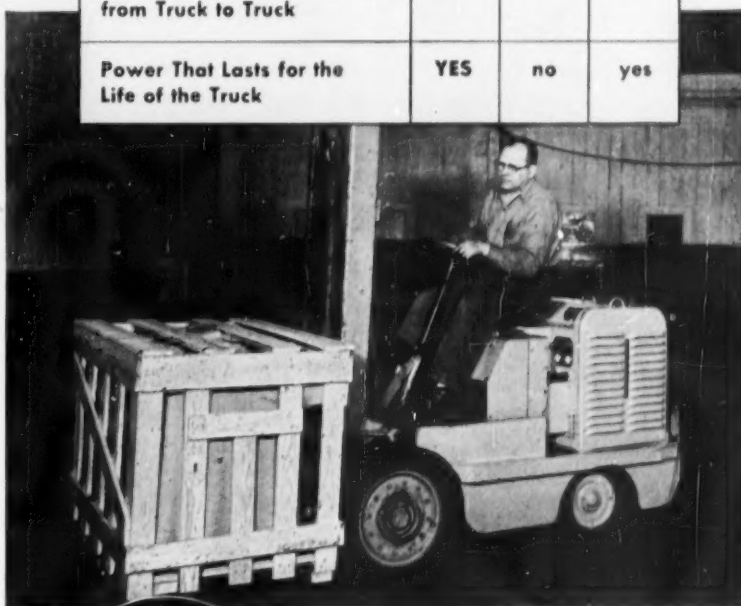


#### SIMPLIFIES PAPER HANDLING

Portable hydraulic-electric elevator designed to simplify paper handling. Elevates skid loads to desired working height. Can be raised or lowered inch or two at a time, so sheets can be slid onto or off skid or table. Operates on

## READY-POWER Gives Materials Handling Trucks ALL 5 ADVANTAGES

	READY-POWER UNITS	POWER TYPE A	POWER TYPE B
Simplicity of Electric Drive	YES	yes	no
Maximum Power for Unlimited Periods	YES	no	yes
Off-the-Truck Power Unit Maintenance and Adjustment	YES	yes	no
Power That's Interchangeable from Truck to Truck	YES	yes	no
Power That Lasts for the Life of the Truck	YES	no	yes



*Remember, Your Truck is No Better Than its Power*

Don't let low "first costs" hide important truck operating advantages. The Ready-Power features, shown above, add up to lowest ton-mile costs, minimum downtime, fleet flexibility, and profitable long-range investment.

Only Ready-Power offers removable gas-electric, LPG-electric and diesel-electric power units for all makes and sizes of electric trucks . . . from walkies to 80,000 lb. giants.

Your present electric trucks can be converted to Ready-Power, and you can order new trucks "Ready-Power-equipped". Write for more information.

## READY-POWER

The READY-POWER Co., 3838 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

Circle No. 147 on Reader Service Card for more information



standard 110 volt, single phase, 60 cycle current. Capacities from 500- to 5000-pounds.

*West Bend Equipment Corporation*  
Circle 327 on Reader Service Card



#### RUGGED TRACTOR-SHOVEL

Rugged construction and advanced design are claimed for this Speedall

tractor-shovel. Features extra heavy-duty power train including power-shift transmission, torque converter and four-wheel drive planetary axles. 1- $\frac{1}{4}$ , 1- $\frac{3}{4}$ , and 2- $\frac{1}{2}$  cubic yard units are available. Said to be actually overdesigned to guarantee maximum power efficiency, longer life and minimum maintenance.

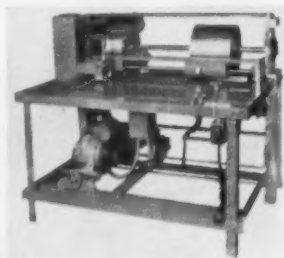
*Pettibone Mulliken Corporation*  
Circle 328 on Reader Service Card

#### DOUBLE CHAIN LIFE

A new series of drop-forged rivetless chains for overhead conveyor use has been developed by this manufacturer. Said to give double life, the need for surface lubrication has been eliminated

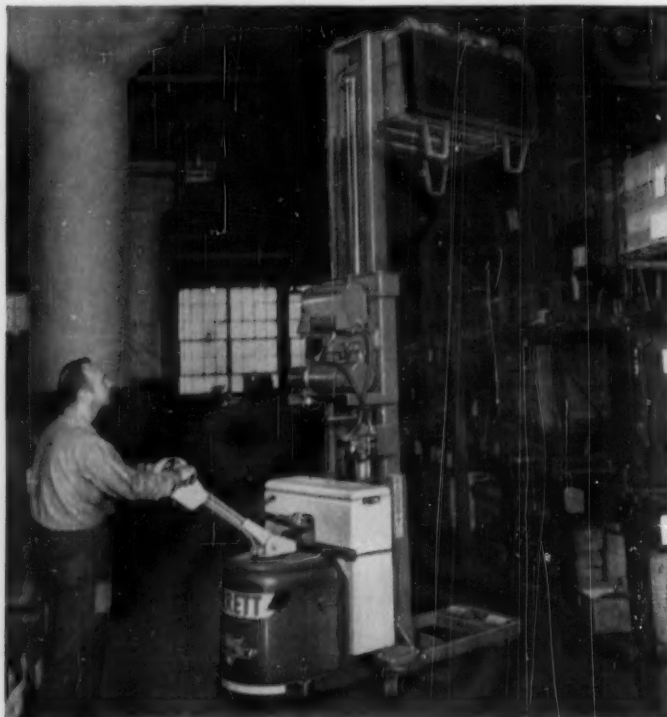
through use of dry lubricant impregnated pins and machined bearing surfaces of both inner and outer links.

*U. S. Engineering Company*  
Circle 329 on Reader Service Card



#### HIGHER SPEED PRINTER

Production-line marking as fast as 3000 impressions per hour are said to be possible with the recently improved Industrial Autoprinter. It is used for coding multiwall bags and shipping containers of many types. Exceptionally smooth operation is reportedly maintained through the use of solenoid-controlled starting and magnetic braking. *Industrial Marking Equipment Co. Inc.*  
Circle 330 on Reader Service Card



Model PO-405-Telescopic

### Store high and save space with **BARRETT HI-LIFTS**

Barrett "walkie-type" PowerOx Hi-Lift trucks are built for floor-to-ceiling storage that conserves space. Available for either platform or pallet handling. Short turning radius for narrow aisle operation. Priced within your budget—low maintenance cost.

• Platform Model PO-40...cap. 4000 to 6000 lb. Travel speed 2 $\frac{1}{2}$  m.p.h. Over-all height 82"—platform elevation 72". Other lifts and telescopic model shown above available. Write for BULLETIN 551-3.

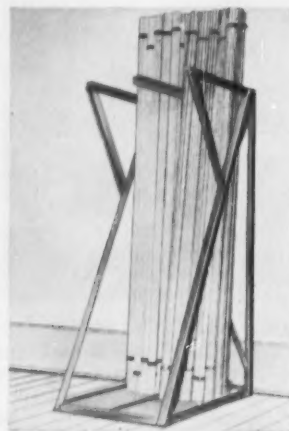
• Fork-type Model TTF-20...cap. 2000 to 3000 lb. Travel speed 2 $\frac{1}{2}$  m.p.h. Over-all height 68" or 83". Fork elevation 91 $\frac{1}{4}$ " or 121 $\frac{1}{4}$ ". Single mast or telescopic models. Write for BULLETIN 5512-2.

**BARRETT-CRAVENS COMPANY**  
614 Dundee Road, Northbrook, Ill.  
Representatives in All Principal Cities.  
Canadian Licensees: S. A. Armstrong, Ltd., Toronto, Canada

**BARRETT**  
SPEED UP YOUR HANDLING...WITH POWEROX  
Circle No. 27 on Reader Service Card for more information

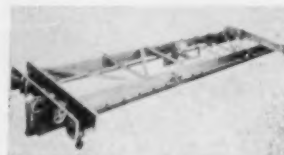


JUST OFF THE PRESS: Bulletin 551-1, 2, 3 Barrett's complete line of "walkie-type" PowerOx Trucks. Send for your copy.



#### SPACE-SAVING CONDUIT RACKS

Lengths of conduit up to ten feet can be stored upright in these all-steel racks which eliminate need for extra wide aisles. Withdrawal of materials is made easier by vertical position. Each rack is separate unit and provides nine square feet of usable space. May be placed singly, in rows, or back-to-back. *The Frick-Gallagher Manufacturing Co.*  
Circle 331 on Reader Service Card



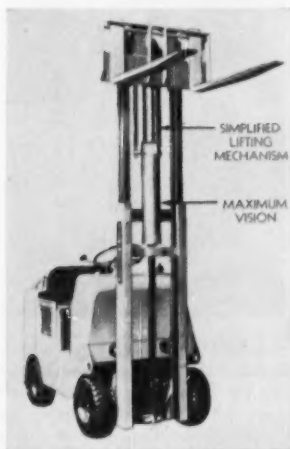
#### FLUID DRIVE CRANES

Better performance and lower maintenance costs are claimed for these



fluid drive cranes. Both motor and crane are oil-protected from extreme shock. Available in capacities up to five tons with spans of 16- to 40-feet in each capacity range.

*Philadelphia Tramrail Company*  
Circle 332 on Reader Service Card



#### HIGH STACKING IN LOW AREAS

An optional feature high free lift mast is now available on gasoline fork truck models LT-35, 500, LT-50, LT-56 and 500-P, designed to facilitate high stacking in low ceiling areas. Assembly provides unusually high free lift before increasing overall lowered height of fork truck. Interchangeable with standard masts.

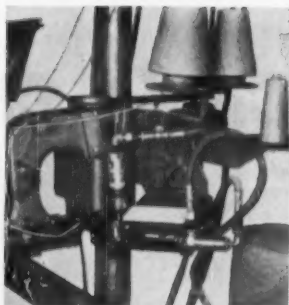
*Towmotor Corporation*  
Circle 333 on Reader Service Card



#### FRAMING MATERIAL DESIGN IMPROVED

Improvement of this line of Dexion do-it-yourself slotted angle framing material has been announced. Typical applications include shelving, racks, conveyor mounts, bins, dollies, etc. Manufactured from cold rolled steel with an electro-galvanized finish, slots and holes are precision engineered for quick, easy bolting. New angle incorporates round holes and transverse bolts at three inch intervals in both legs.

*Acme Steel Company*  
Circle 334 on Reader Service Card



#### BAG TAGGER-CODER

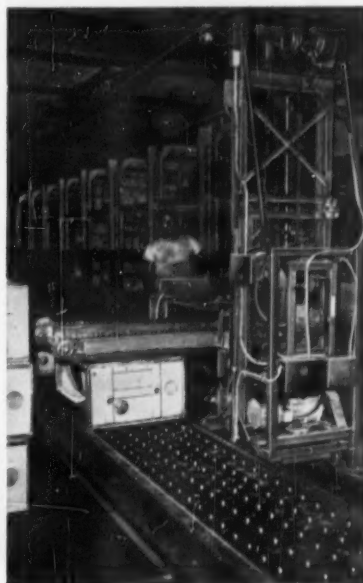
Bag sewing, tagging and coding can be accomplished in a single operation

with the equipment shown here. As a bag is fed through the sewing machine, the tagger feeds out a tag to be sewed in place. At the same time, a coder punches identifying holes in the tag. It permits secret code identification of merchandise. The unit is available with manual-feed or automatic-feed.

*Mill Engineering Co.*  
Circle 335 on Reader Service Card

#### NEW CONVEYOR STAND

New permanent-type support stand for mounting gravity and power conveyors to the floor is called Rapistand. Unit has telescoping steel legs for



Specially designed custom elevator.



Portable, manually operated elevator.

## BARRETT ELEVATORS... from foot-operated models to custom jobs

Barrett has the answer to any handling problem. You may require an economical portable elevator of 500 to 5000 lb. capacity. Or, possibly a telescopic model, platform or fork pallet type is best suited to your needs. Barrett has them—write for Bulletin 558.

**CUSTOM MODELS**—designed for special handling jobs also available. Elevator types (illustrated at left) stack material "ceiling high" to conserve valuable floor area for production operations.

B

**BARRETT-CRAVENS COMPANY**  
614 Dundee Road, Northbrook, Illinois  
Representatives in All Principal Cities  
Canadian Licensee: S. A. Armstrong, Ltd., Toronto, Canada

Barrett  
Handling  
Equipment

BARRETT

ONE MAN DOES MORE THAN 3 OR 4... WITH A BARRETT



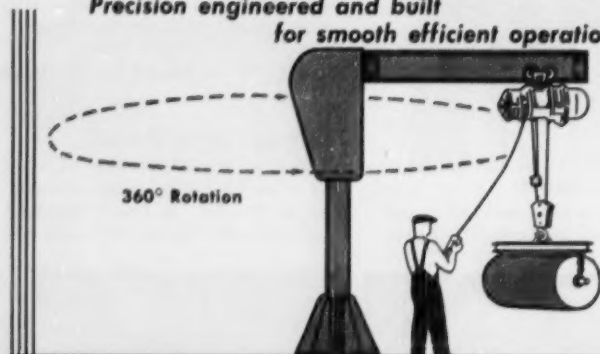
Write for catalog 535 on  
the complete Barrett Line

Circle No. 87 on Reader Service Card for more information

# Industrial JIB CRANES

HEAVY DUTY

Precision engineered and built  
for smooth efficient operation



Industrial PBM self-supported Jib Cranes are of all welded steel construction, rotate 360 degrees and have capacities up to 12,000 lbs. The rotating steel head revolves on 4 rollers and 9 precision ball bearings resulting in extremely smooth operation—unsurpassed by any other crane of its type. The high standard of workmanship and material, coupled with reliable performance make Industrial Jib Cranes your best buy.

Industrial manufactures 6 other types of jibs and many models of Overhead Traveling Cranes to cover every need. Consult with Industrial for cranes to solve your material handling problems.

Write  
for  
Catalog

## INDUSTRIAL CRANE & HOIST CORPORATION

1531 SOUTH PAULINA STREET

CHICAGO 8, ILLINOIS

Overhead Cranes • Jib Cranes • Monorail Systems • Crane Runways  
Representatives in Principal Cities

height adjustment and is available in a variety of widths.

The Rapids-Standard Company, Inc.  
Circle 336 on Reader Service Card



### BOX DUMPING DEVICE

Hydraulically operated box dumping device for Transveyor trucks. Designed for use with loose-bottom boxes used for handling scrap or parts in process, device consists of extra mast fitted with special face plate. In operation, forks are raised to dumping height; face plate engages lip of box and raises it high enough to dump contents.

Automatic Transportation Company

Circle 337 on Reader Service Card

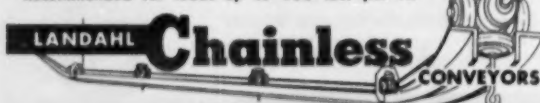


### Chainless Conveyor Pulls Floor Trucks

This space-saving, lightweight Landahl CHAINLESS Conveyor pulls floor trucks throughout the system. It gives smooth, free movement . . . permits short-radius turns . . . has less bulk and weight than ordinary conveyors of equal capacity. No chains or cables to kink, pile up, or wear out. Unique steel-rod connectors pivot freely at both ends on hardened, self-lubricating ball-and-socket joints.

Write for new bulletin G-100

Recommended for loads up to 100 lbs. per ft.



The LANDAHL CONVEYOR CO., 13129 Athens Ave., Cleveland 7, Ohio  
A SUBSIDIARY OF THE AMERICAN MONORAIL COMPANY

Circle 129 on Reader Service Card for more information  
198

## YOUR BEST MOVE IS TO MOVE WITH MERRILL MATERIAL HANDLING DEVICES



For Interesting Information write

## MERRILL BROTHERS

56-74 ARNOLD AVE., MASPETH, N. Y.

Circle 117 on Reader Service Card for more information  
FLOW (EQUIPMENT & SUPPLIES SECTION)

Circle No. 1 on Reader Service Card

# Airmatic...



## THE MODERN MECHANICAL MESSENGER SYSTEM

Airmatic pneumatic tube systems do their jobs so smoothly, so efficiently, so quickly that they don't receive any "fanfare" and "fuss". They're just taken for granted as time, labor and money savers in providing for the transporting of bottles, parts, samples, fragile medical supplies, complete files and IBM cards as well as the traditional uses for transporting papers and money.

There's an AIRMATIC SYSTEM for your need. Contact your local representative or the AIRMATIC home office for further information.

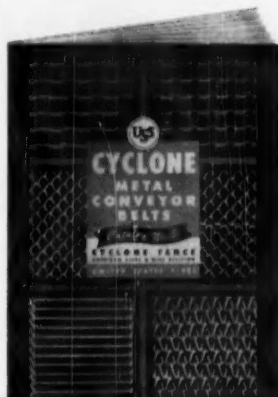
### AIRMATIC SYSTEMS, INC.

378 Bergen Blvd., Fairview, N.J.  
Phone: CLiRside 6-0475

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# Processing costs too high?

## Send for this FREE catalog



Cyclone Metal Conveyor Belts are working wonders—cutting processing costs, speeding operations, increasing product output. They are flexible—open meshed—sanitary—immersible in water, oils, chemicals—temperature resistant. Cyclone Belts come in several basic styles and in carbon, alloy and stainless steels. There are many mesh and wire sizes available together with various accessories.

This big, 32-page catalog will show you the extremely wide scope of Cyclone Belts—the most complete line of wire mesh processing belts now available. There are actual pictures of many applications. See why Cyclone Belts can do your particular job so well.

### CYCLONE FENCE DEPARTMENT

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION  
WAUKEGAN, ILLINOIS  
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

### MAIL THIS COUPON

Cyclone Fence, Dept. A-95  
Waukegan, Illinois

Please send me your big, illustrated Catalog #5. No charge or obligation.

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

## USS CYCLONE METAL CONVEYOR BELTS

SPIRAL WOVEN  
FLAT WIRE - FLEX-GRID



UNITED STATES STEEL

## Coming Soon...

# F.D.

# M.C.M.H.I.

(See Page 44)



## ROWE ADJUST-A-TRUCK

■ If you can't adjust your dock level, because of space limitations, you can use the Rowe ADJUST-A-TRUCK which is set into the pavement in front of the dock. By means of a heavy-duty electric hydraulic system, it adjusts each vehicle to required dock height. Capacity: 40,000 lbs.

Write for free, illustrated brochure. It's brand new.

### ROWE METHODS, INC.

2534-C DETROIT AVE. • CLEVELAND 13, OHIO

Circle 154 on Reader Service Card for more information

SEPTEMBER, 1955



Circle No. 183 on Reader Service Card

# FOR PHENOMENAL SAVINGS IN PLANT LAYOUT



## FROM LAYOUT TO BLUEPRINT WITH NO DRAFTING



TemPrints are outline prints on transparent film, reproducing to exact scale the standard machines in your plant or made to engineering specifications of you; office, materials handling, assembly, with tapes for walls, partitions, aisles, etc.

TemPrint Grids are transparent sheets cross-lined to 1/4" scale suitable for layout and floor plans.

When TemPrints are cut out and applied to the grids, the result is an accurate layout of your plant or office. Any number of duplicate prints accurately reproduced in the same size may then be made by processing through an Oxafid machine.

## SIMPLY MAKE THE LAYOUT—AND THE LAYOUT WILL MAKE YOUR PRINTS

### SCALE INDUSTRIAL MODELS



Harman has specialized in scale models for many years. Harman Miniatures are accurate reproductions to scale of well-known plant machinery and equipment. All models are dimensionally accurate — may be identified instantly. A special catalog is available on request.

### SEND FOR CATALOG TODAY!

**HARMAN ASSOCIATES**

HALESITE, L. I., NEW YORK

## CLASSIFIED ADVERTISING

### PARTNER WANTED

Active partner with substantial capital needed by overloaded conveyor and storage equipment manufacturer. Have outstanding products but not enough capital and management time. Write c/o FLOW, Box 9155.

### POSITION WANTED

SALESMANAGER, with engineering background, wants position with materials handling manufacturer. 17 years experience in sales and engineering. Write, c/o FLOW, Box 9255

### HELP WANTED

SALES REPRESENTATIVE—handling line of custom-built conveyors for company established over thirty years. Materials handling experience required. Please submit complete resume. Write, c/o FLOW, Box 9355.

### FOR SALE

Material Handling Sales and Service Business, supplies, engineering, repairs and equipment. Established 17 years in Texas. Will sacrifice due to retiring. Write c/o FLOW, Box 9455.

100—Used Oak Constructed Transfer Trucks 48" L x 26" W x 17" H—2-14" Center Wheels Stationary—1-7" Wheel each end Swivel, \$5.00 each.  
100—Used 8000# Warehouse H.D. Platform Trucks 75" L x 36" W with removable Bar Handles—Steel Bound Deck Frames, Manual Couplings for Towing, \$22.50 each or 5 for \$100.00—Lots of 25—\$15.00 each. Sam Becker & Sons, Route 20, Oberlin Road at B.O. RR, P. O. Box 332, Elyria, Ohio.

Circle No. 33 on Reader Service Card

# BOWERS BATTERIES

*Always Better*

BOWERS BATTERY & SPARK PLUG CO., READING, PA.

## The Martin-Decker Sensater



gives you  
amazing  
hook-scale  
accuracy

The SU-20 Sensater is a new kind of hydraulic hook scale whose frictionless, rolling-stroke diaphragm assures you 1/4 of 1% accuracy. The Sensater is compact and light weight, yet ruggedly designed for years of trouble-free operation. Dial lifts up or down to any eye level. Full 360° dial. Full 360° hook rotation. High safety factor. Capacities: 2,500; 5,000; 10,000; and 20,000 lbs. Write for prices and descriptive literature. Martin-Decker Corporation, 3431 Cherry Avenue, Long Beach 7, California, Department N-9

**MARTIN-DECKER CORP.**  
HOME OF THE WEIGHT INDICATOR — LONG BEACH, CALIFORNIA

## FOR SALE

# 4 GALLON PETROL CAN MAKING & FILLING PLANT

### BLISS AUTOMATIC PLANT

complete for Making, Filling, and Capping  
4 Gallon (Imperial) Petrol Cans

All joints soldered, panelled sides, tops and bottoms. Newman type cap. Cans fitted with wire handles and cleats.

**Output 20,000 per 8-hour day.**

*Immediate inspection under ideal working conditions in Wales.*

We would **DIVIDE AND SELL AS TWO SEPARATE PLANTS** each with output of 10,000 cans per 8-hour day.

Codewords: as one plant SM8FU  
as two plants SM8GA  
Complete details, photos, etc., from

**F. J. EDWARDS LTD.,**

359 Euston Road, London, N.W.1 England.

PHONES: EUSTON 4681 or 3771 CABLES: BESCOTOOLS LONDON



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\*Pat. Pend.

\*\*Pat. No. 2659914

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